

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Czyszczewski et al.

Application No.: 10/777,575

Group No.: 2625

Filed: February 12, 2004

Examiner: Namitha Pillai

For: METHOD SYSTEM AND APPARATUS FOR SCRIPTABLE
MULTIFUNCTION DEVICE CONTROLLER

Mail Stop Appeal Brief - Patents

Commissioner for Patents

P. O. Box 1450

Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

Appellants herewith file a Brief in support of their Appeal in the above identified matter. Also being submitted is the \$540 fee under 37 C.F.R. 41.20(b)(2) for the Appeal Brief.

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i. REAL PARTY IN INTEREST

The real party in interest is InfoPrint Solutions Company LLC., the employer of the inventors at the time of the invention and the assignee of the patent rights in the above-identified matter.

ii. RELATED APPEALS AND INTERFERENCES

No other appeals, interferences, or related applications are known to the Appellants, the Appellants' legal representative, or the Assignee, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

iii. STATUS OF CLAIMS

Claims 1, 3, 5-6, 9-12, 15-17, and 21-24 stand rejected and remain in the application for consideration on appeal. Claims 2, 4, 7-8, 13-14, and 18-20 are cancelled and are not under consideration. The 35 U.S.C. § 101 rejection of claims 1, 3, 5-6, 9-12, 15-17, and 21-24, the 35 U.S.C. § 102(e) rejection of claims 1, 3, 5-6, 9-11, 15-17, and 21-24, and the 35 U.S.C. § 103(a) rejection of claim 12 form the basis of this appeal.

iv. STATUS OF AMENDMENTS

No Amendments have been filed since the Office Action dated May 13, 2009.

v. SUMMARY OF THE CLAIMED SUBJECT MATTER

Claim 1 recites a multifunction device (See FIGS 1-2). The multifunction device includes a communication module (Paragraph 9), a controller module (element 102, FIG 1-2; Paragraph 7), a user interface module (element 218, FIG. 2; Paragraph 8), a source interface module (Paragraph 7), and a target interface module (Paragraphs 8-9). The communication module is configured to communicate with a server over a network (Paragraph 9). The controller module is configured to control the operation of the multifunction device and to interface with a business application executing on the server, where the server provides a business application interface to the multifunction device for interfacing to the business application (Paragraph 7; element 102 of FIG. 1; Paragraph 43). The user interface module is configured to present the business application interface from the server on a display integral to the multifunction device and to provide input and output fields for the business application interface to a user for user input (element 218 of FIG. 2; Paragraphs 33-34). The source interface module is configured to receive input data from at least one document data source (Paragraphs 7-8). The controller module is further configured to transmit the input data from the at least one document data source and the user input to the business application executing on the server (Paragraph 7). The target interface module is configured to output the input data from the at least one document data source and the user input as processed document data (Paragraphs 7-8).

Claim 15 recites computer network system. The computer network system includes a server connected to a network (Paragraph 10), a user interface module within the multifunction device (element 218, FIG. 2), a facsimile module within the multifunction device (element 202, FIG. 2), an e-mail module within the multifunction device (element 204, FIG. 2), a controller module within the multifunction device (element 102, FIG. 2), and a source interface module within the multifunction device (Paragraph 7). The server is configured to provide business application interfaces to a multifunction device for interfacing to business applications executing on the server (Paragraphs 11, 32, and 36). The user interface module is configured to communicate with a plurality of multifunction devices over the network (Paragraph 10). The facsimile module is configured to send facsimiles (Paragraph 10). The e-mail module is configured to send e-mails (Paragraph 10). The controller module is configured to control the

operation of the multifunction device and to interface with the business applications executing on the server (Paragraph 7). The user interface module is further configured to present the business application interfaces from the server on a display integral to the multifunction device and to provide input and output fields for the business application interfaces to a user for user inputs (Paragraphs 8 and 26). The source interface module is configured to receive input data from at least one document data source (Paragraph 7). The controller module is further configured to transmit the input data from the at least one document data source and the user inputs to the business applications executing on the server (Paragraph 9).

vi. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 1, 3, 5-6, 9-12, 15-17, and 21-24 are statutory under 35 U.S.C. § 101.
2. Whether claims 1, 3, 5-6, 9-11, 15-17, and 21-24 are anticipated by U.S. Patent No.: 7,180,638 (Hou) under 35 U.S.C. § 102(e).
3. Whether claim 12 is unpatentable over U.S. Patent No.: 7,180,638 (Hou) in further view of U.S. Patent No.: 5,361,134 (Hu) under 35 U.S.C. § 103(a).

vii. ARGUMENT

1. Rejection of claims 1, 3, 5-6, 9-12, 15-17, and 21-24 under 35 U.S.C. § 101.

The Examiner rejected claims 1, 3, 5-6, 9-12, 15-17, and 21-24 under 35 U.S.C. § 101, suggesting that although the claims are directed to an apparatus, the claims do not disclose that the apparatus comprises a physical hardware device. The Appellants submit that the claims recite a statutory machine under 35 U.S.C. § 101.

Claim 1 recites a multifunction device comprising a controller module, a user interface module, a source interface module, and a target interface module. In the Appellants' pending application, multifunction devices are broadly disclosed as devices that integrate facsimile, scanner, copier, and printing functions (Paragraph 1, and Paragraph 8). A disclosure is also made that the modules may be implemented as hardware circuits comprising custom VLSI circuits or gate arrays, off-the-shelf semiconductors such as logic chips, or transistors. In addition, disclosure is made that the modules may be implemented in programmable hardware devices such as field programmable gate arrays, programmable array logic, programmable logic devices, or the like (Paragraph 20).

The Appellants submit that one skilled in the art would recognize that "a multifunction device" as recited in claim 1 is a tangible electronic hardware device, of which the Appellants submit is a statutory machine under 35 U.S.C. § 101. Paragraphs 1 and 8 of the specification further reiterate the machine aspect of the multifunction device of claim 1 by providing examples of multifunction devices, which integrate facsimile, scanner, copier, and printing function. For at least these reasons, the Appellants maintain that claim 1 recites a statutory machine under 35 U.S.C. § 101. Similar arguments apply for dependent claims 3, 5-6, and 9-12.

Claim 15 recites a computer network system comprising a server connected to a network and configured to provide business application interfaces to a multifunction device, a user interface module within the multifunction device, a facsimile module within the multifunction device, an e-mail module within the multifunction device, a

controller module within the multifunction device, and a source interface module within the multifunction device.

The Appellants submit that one skilled in the art would recognize "a server" within a computer network system as a tangible electronic hardware device, of which the Appellants submit is a statutory machine under 35 U.S.C. § 101. Claim 15 additionally recites various modules within the multifunction device, the tangibility of which the Appellants have previously addressed with respect to claim 1 above. For at least these reasons, the Appellants maintain that claim 15 recites a statutory machine under 35 U.S.C. § 101. Similar arguments apply for dependent claims 16-17, and 21-24.

2. Rejection of claims 1, 3, 5-6, 9-11, 15-17, and 21-24 under 35 U.S.C. § 102(e).

The Examiner rejected claims 1, 3, 5-6, 9-11, 15-17, and 21-24 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No.: 7,180,638 (Hou). The Appellants submit that the claims are novel in view of Hou.

First, the Appellants submit that Hou does not teach "a multifunction device comprising a controller configured to interface with a business application executing on a server, wherein the server provides a business application interface to the multifunction device for interfacing to the business application" as recited in claim 1. Hou discloses a web fax server 102 in communication with a web client 104 executing a web browser 106 (FIG. 1). In Hou, the web fax server includes an HTTP server 304 (FIG. 3), which supports connections with multiple clients such as web client 104. The HTTP server generates and sends a fax document form used to input fax information from a user via a web browser executing on the web client (FIG. 3, column 5, lines 35-40). For example, an office may include the web fax server disclosed in Hou. An employee at the office may run a web browser on their computer to connect to the web fax server for sending and receiving faxes. By utilizing the web browser to connect to the web fax server, the employee is not required to physically travel to the web fax server to send and receive the faxes.

The Appellants submit that there is no teaching in Hou to suggest that the web fax server includes a controller configured to interface with a business application executing on a server. For example, the web fax server does not interface with mail applications executing on mail server 204 of FIG. 2. The web fax server also does not interface with any proxy applications executing on proxy server 212 of FIG. 2. Instead, the HTTP server within the web fax server receives HTTP requests for web pages from a remote web browser, and transmits the requested pages to the remote web browser for display.

In the pending application, for example, the multifunction device interfaces with business applications executing on a server. An interface for the business application is provided from the server to the multifunction device for interfacing with the business application. A user interface module on the multifunction device presents the interface for the business application to a user on a display integral with the multifunction device. A user at the multifunction device may then access the business application executing on the server through the user interface. The user may, for example, provide input data to the business application on the server through the user interface.

The Appellants submit that the multifunction device recited in claim 1 provides advantages over Hou. By providing an interface on the multifunction device to a business application executing on a server, a user may enter information directly on the multifunction device for the business application. For example, the user may enter expense information through the user interface on the multifunction device directly into an expense application executing on a server. After entering the expense information, a user may then print an expense report directly on the multifunction device.

Second, the Appellants submit that Hou does not teach "a multifunction device comprising a user interface module further configured to present the business application interface from the server on a display integral to the multifunction device and to provide input and output fields for the business application interface to a user for user input" as recited in claim 1. Hou discloses in FIG. 4 that a web browser on a client computer can "browse" to a web page generated by the HTTP server within the web fax server for inputting data and sending a fax. The user can optionally enter data on the webpage using the browser (elements 402-410) and select a file for faxing (element 412). In Hou, user input is entered on a remote computer operating a web client, which is in

communication with the HTTP server within the web fax server. This is in contrast to the multifunction device of claim 1, which displays a business application interface locally on the multifunction device for directly entering user input data into the business application executing on the server.

The Appellants submit that for at least the reasons provided, that claim 1 is novel in view of Hou. Similar arguments apply for claim 15. Dependent claims 3, 5-6, 9-11, 16-17, and 21-24 are novel at least for depending on allowable base claims 1 and 15.

3. Rejection of claim 12 under 35 U.S.C. § 103(a).

The Examiner rejected claim 12 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No.: 7,180,638 (Hou) in further view of U.S. Patent No.: 5,361,134 (Hu). The Appellants submit that for at least the reasons provided for argument (2) above, and for depending on novel base claim 1, that claim 12 is non-obvious in view of the combination of Hou and Hu.

viii. CLAIMS APPENDIX

1. A multifunction device comprising:

a communication module configured to communicate with a server over a network;

a controller module configured to control the operation of the multifunction device and to interface with a business application executing on the server, wherein the server provides a business application interface to the multifunction device for interfacing to the business application;

a user interface module configured to present the business application interface from the server on a display integral to the multifunction device and to provide input and output fields for the business application interface to a user for user input;

a source interface module configured to receive input data from at least one document data source,

the controller module further configured to transmit the input data from the at least one document data source and the user input to the business application executing on the server; and

a target interface module configured to output the input data from the at least one document data source and the user input as processed document data.

3. The multifunction device of claim 1, further comprising a plurality of application integration modules configured to interface with a specific business application executing on the server.

5. The multifunction device of claim 1, wherein the user interface module is further configured to allow the user to customize the business application interface.

6. The multifunction device of claim 1, further comprising a scanning device configured to transmit document data to the source interface.

9. The multifunction device of claim 1, wherein the target module is configured to output the processed document data as a facsimile.
10. The multifunction device of claim 1, wherein the target module is further configured to output the processed document data as an e-mail.
11. The multifunction device of claim 1, wherein the target module is further configured to output the processed document data to a printer on the multifunction device.
12. The multifunction device of claim 1, wherein the user interface module is further configured to interface with a touch screen to allow the user input.

15. A computer network system comprising:

- a server connected to a network and configured to provide business application interfaces to a multifunction device for interfacing to business applications executing on the server;

- a user interface module within the multifunction device configured to communicate with a plurality of multifunction devices over the network;

- a facsimile module within the multifunction device configured to send facsimiles;

- an e-mail module within the multifunction device configured to send e-mails;

- a controller module within the multifunction device configured to control the operation of the multifunction device and to interface with the business applications executing on the server,

- the user interface module within the multifunction device further configured to present the business application interfaces from the server on a display integral to the multifunction device and to provide input and output fields for the business application interfaces to a user for user inputs; and

- a source interface module within the multifunction device configured to receive input data from at least one document data source,

- the controller module within the multifunction device further configured to transmit the input data from the at least one document data source and the user inputs to the business applications executing on the server.

16. The computer network system of claim 15, wherein the facsimile module comprises a facsimile apparatus configured to communicate with the server over the network.

17. The computer network system of claim 15, wherein the e-mail module comprises an e-mail server configured to communicate with the server over the network.

21. The multifunction device of claim 1, wherein the user interface module is further configured to modify the business application interface based on an identity of the user.

22. The multifunction device of claim 21, wherein the user interface module is further configured to receive programs from the server based on the identity of the user, and wherein the programs are operable to modify the operation of the multifunction device.

23. The computer network system of claim 15, wherein the user interface module is further configured to modify the business application interface based on an identity of the user.

24. computer network system of claim 23, wherein the user interface module is further configured to receive programs from the server based on the identity of the user, and wherein the programs are operable to modify the operation of the multifunction device.

xi. EVIDENCE APPENDIX

Included are copies of the evidence relied upon by the Examiner as to the grounds of the rejections under 35 U.S.C. § 101, 35 U.S.C. § 102(e), and 35 U.S.C. § 103(a) to be reviewed on appeal.

1. U.S. Patent No.: 7,180,638 (Hou) for the 35 U.S.C. § 102(e) rejection.
2. U.S. Patent Application No.: 10/777,575 (Appellants' pending application) for the 35 U.S.C. § 101 rejection.
3. U.S. Patent No.: 5,361,134 (Hu) for the 35 U.S.C. § 103(a) rejection.

x. RELATED PROCEEDINGS APPENDIX

None.

SUMMARY

Appellants argue that the Examiner's rejections of claims 1, 3, 5-6, 9-12, and 21-24 under 35 U.S.C. § 101 the rejection of claims 1, 3, 5-6, 9-11, 15-17, and 21-24 under 35 U.S.C. § 102(e), and the rejection of claim 12 under 35 U.S.C. § 103(a) are inadequate as a matter of law and should be reversed.

Date: November 11, 2009

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(12) **United States Patent**
Hou et al.

(10) **Patent No.:** **US 7,180,638 B1**
(45) **Date of Patent:** **Feb. 20, 2007**

- (54) **NETWORK FAX MACHINE USING A WEB PAGE AS A USER INTERFACE**
- (75) Inventors: **Xiaoan Hou**, Santa Clara, CA (US);
Yahya Hamadani, Sunnyvale, CA (US)
- (73) Assignee: **Ricoh Co., Ltd.**, Tokyo (JP)
- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(57) **ABSTRACT**

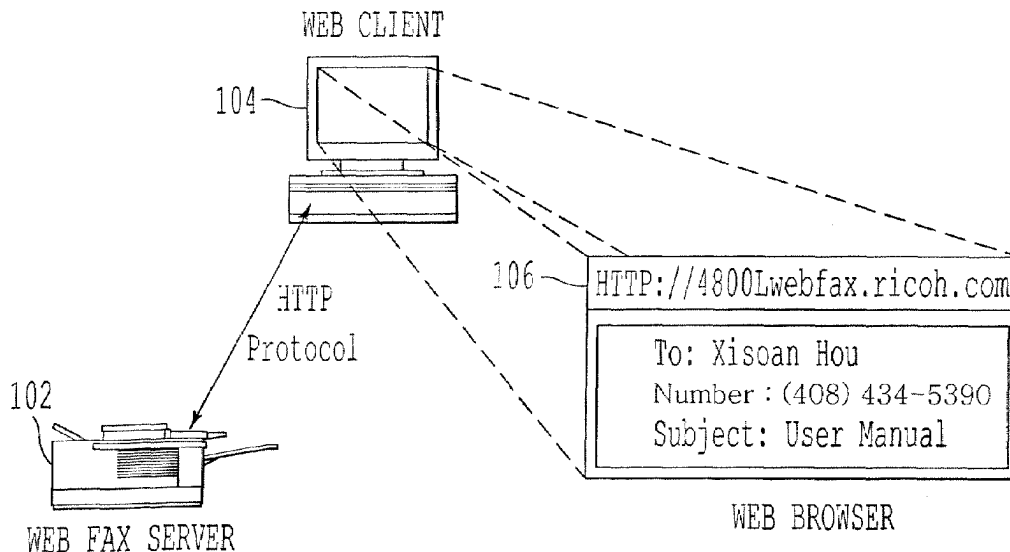
A network fax machine for faxing files received from a remote client includes a server unit and a fax control unit. The server unit sends a fax document form to a remote client and receives fax information from the remote client. The fax information includes an identifier corresponding to a destination fax machine and a file to be faxed to the destination fax machine. The fax control unit is configured to use the identifier to connect the network fax machine to the destination fax machine and configured to send the file to the destination fax machine by facsimile communication.

22 Claims, 9 Drawing Sheets

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EP	0 354 703	2/1990
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JP	63-269665	11/1988
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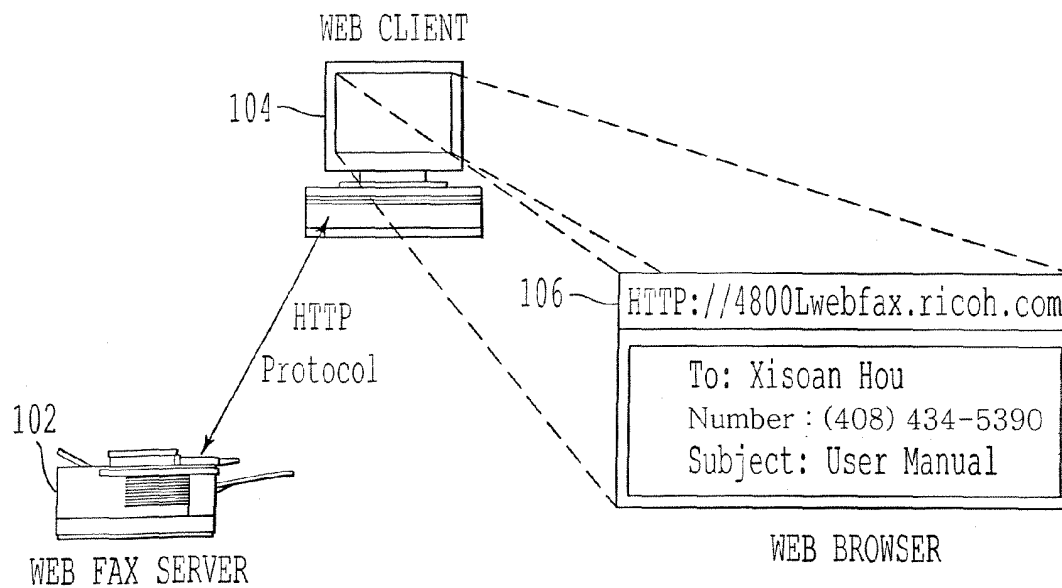


FIG. 1

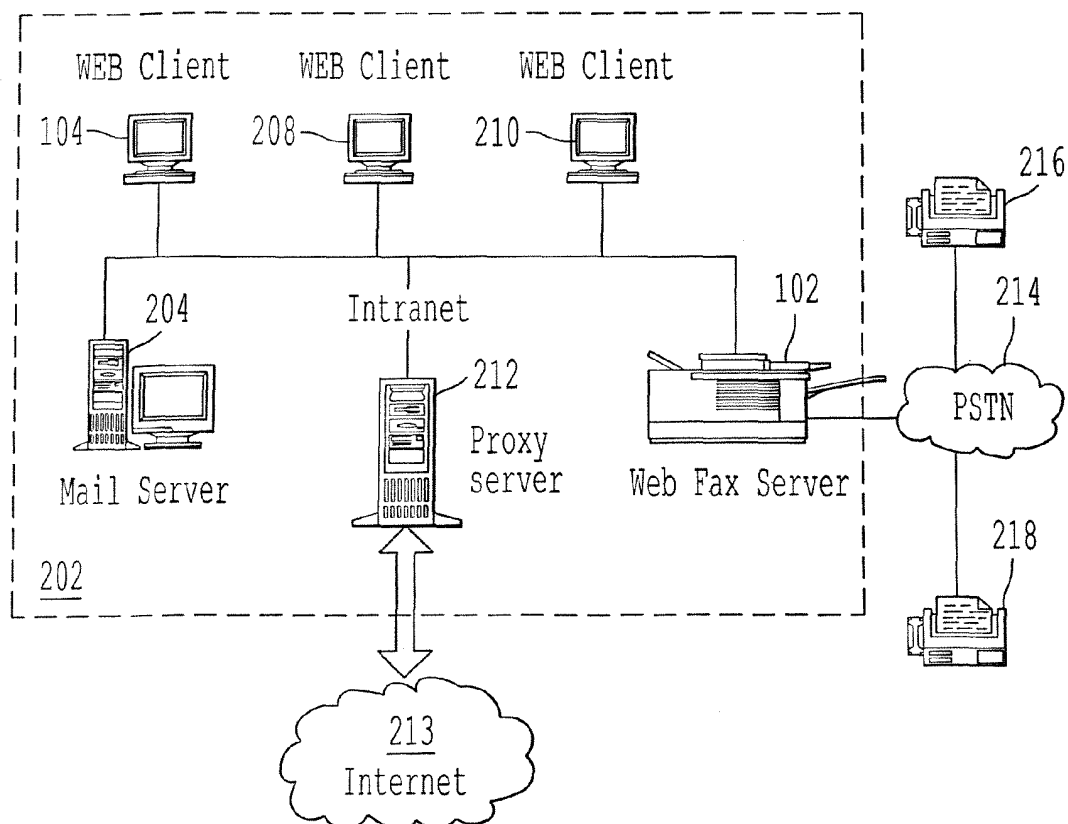


FIG. 2

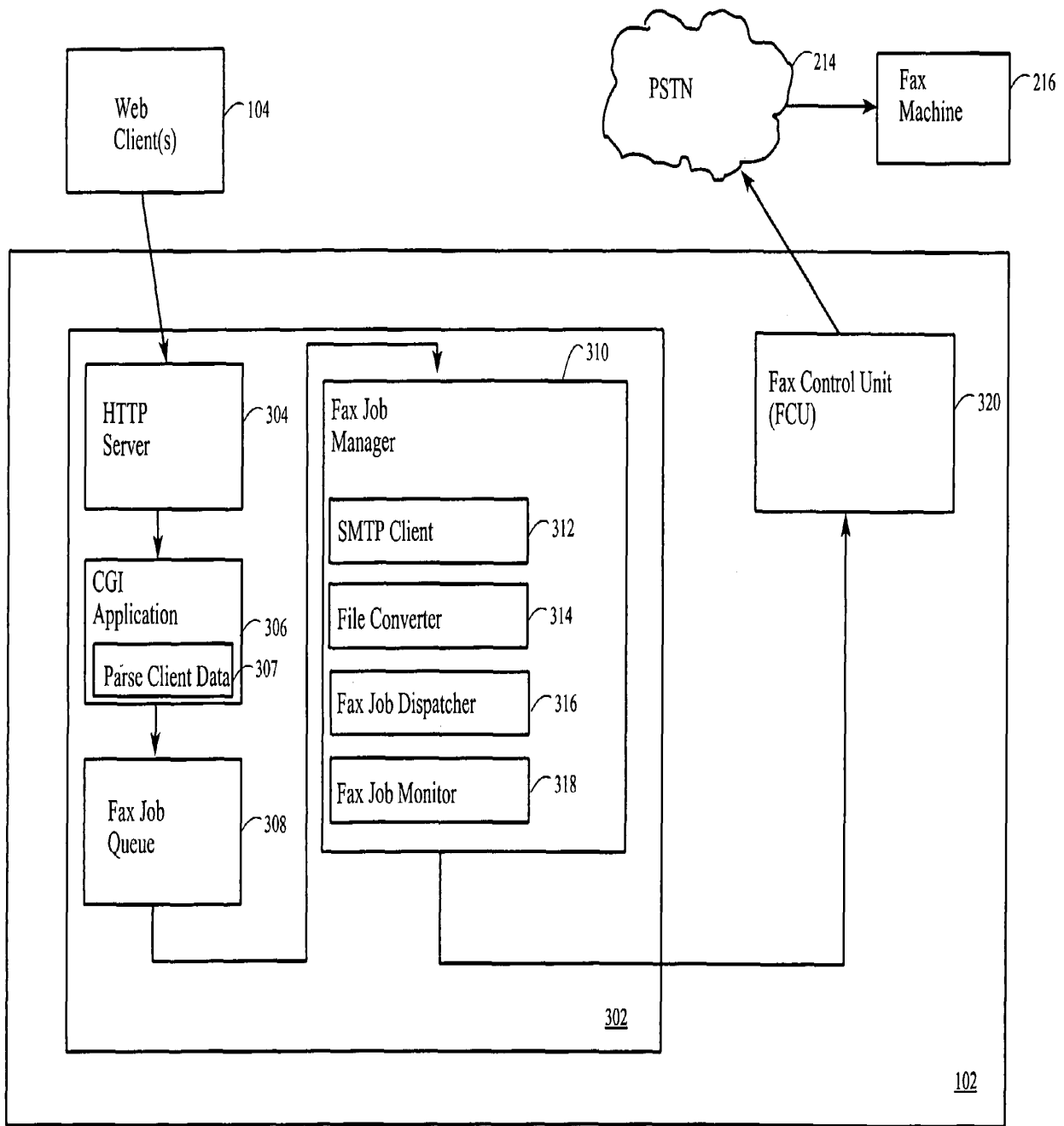


Figure 3

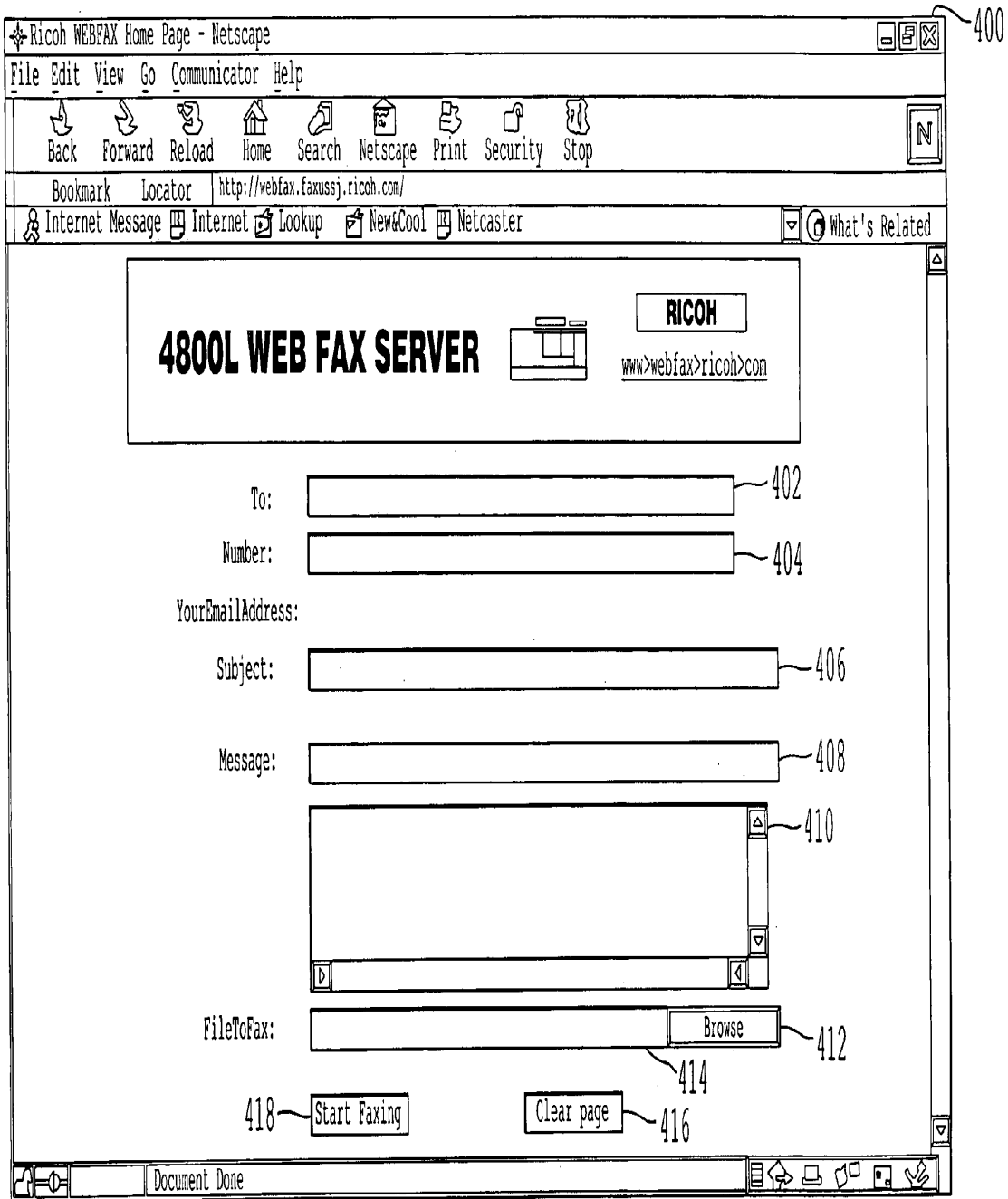


FIG. 4

500

FAX JOB LOG

502	504	506	508	510	512	514	516	518
Job Number	Status	Date	Time	Receiver's Name	Fax Number	Sender's Email	Job ID	Comment
0001	OK	09/28/99	17:28:01	Sir	9545353	hou@fax.ussj.ricoh.com	fax00001	
0002	OK	09/28/99	17:28:20	Sean	4345390	she@fax.ussj.ricoh.com	fax00001	
0003	OK	09/28/99	17:30:01	Jerry	15114345390	hou@fax.ussj.ricoh.com	fax00001	
0004	OK	09/28/99	17:31:23	Jack	9545353	shen@fax.ussj.ricoh.com	fax00001	
0005	ERROR	09/28/99	17:31:30	John	434-5390	hou@fax.ussj.ricoh.com	fax00001	ERR=01
0006	OK	09/28/99	17:40:01	Ken	19121224567	hou@fax.ussj.ricoh.com	fax00001	
0007	OK	09/28/99	17:40:02	Kim	9545353	shen@fax.ussj.ricoh.com	fax00002	

My Computer

FIG. 5

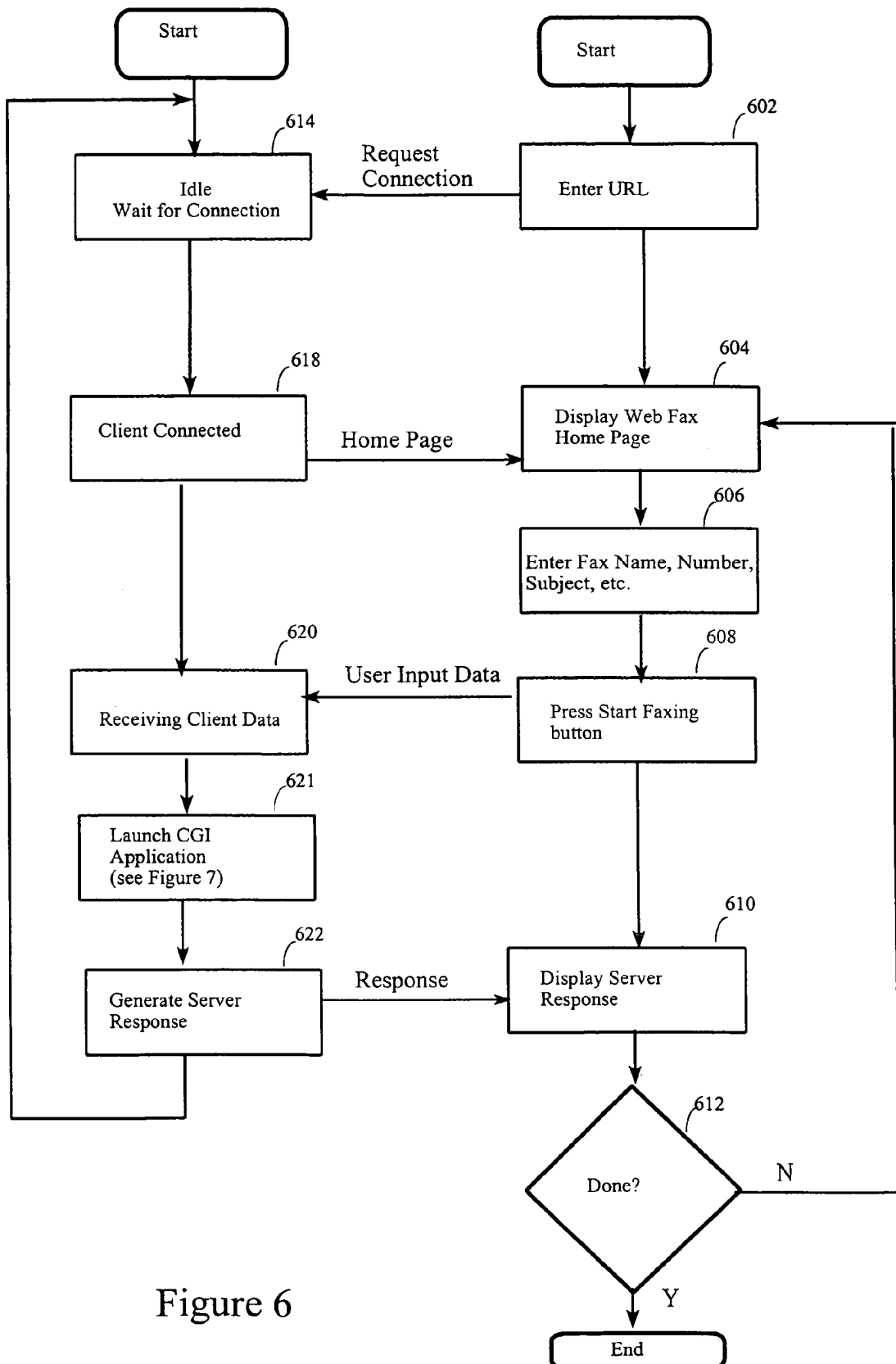
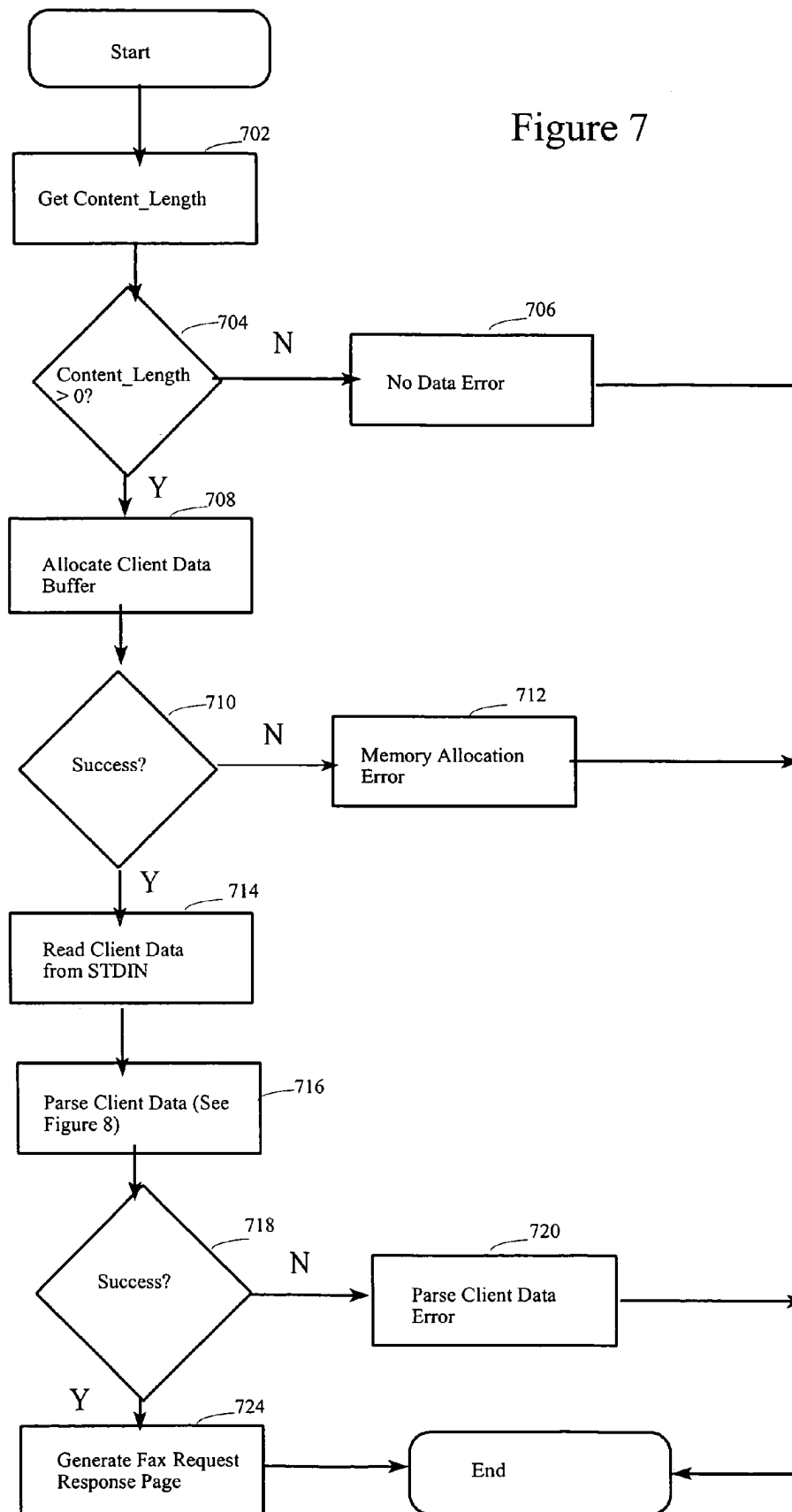


Figure 6

Figure 7



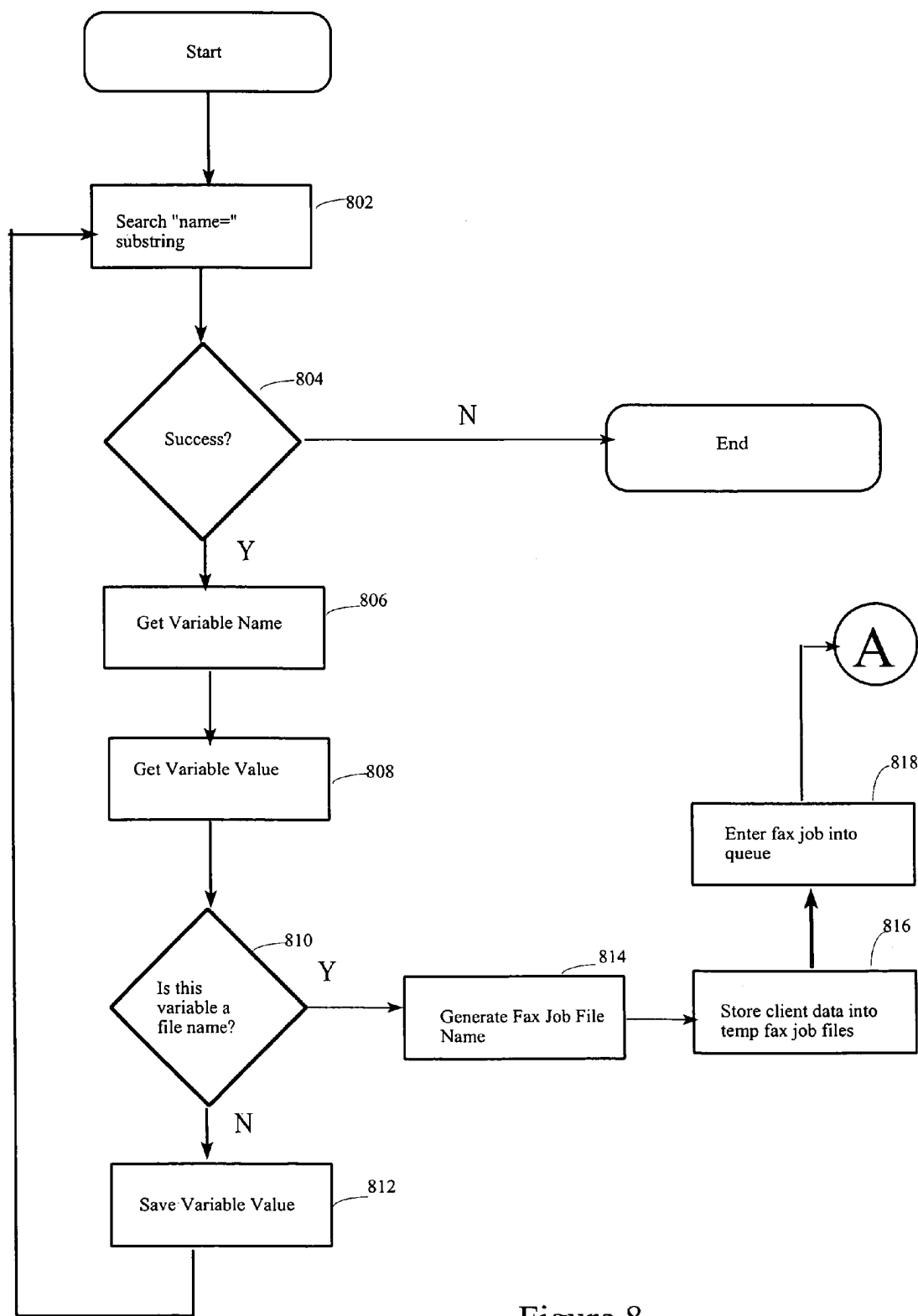


Figure 8

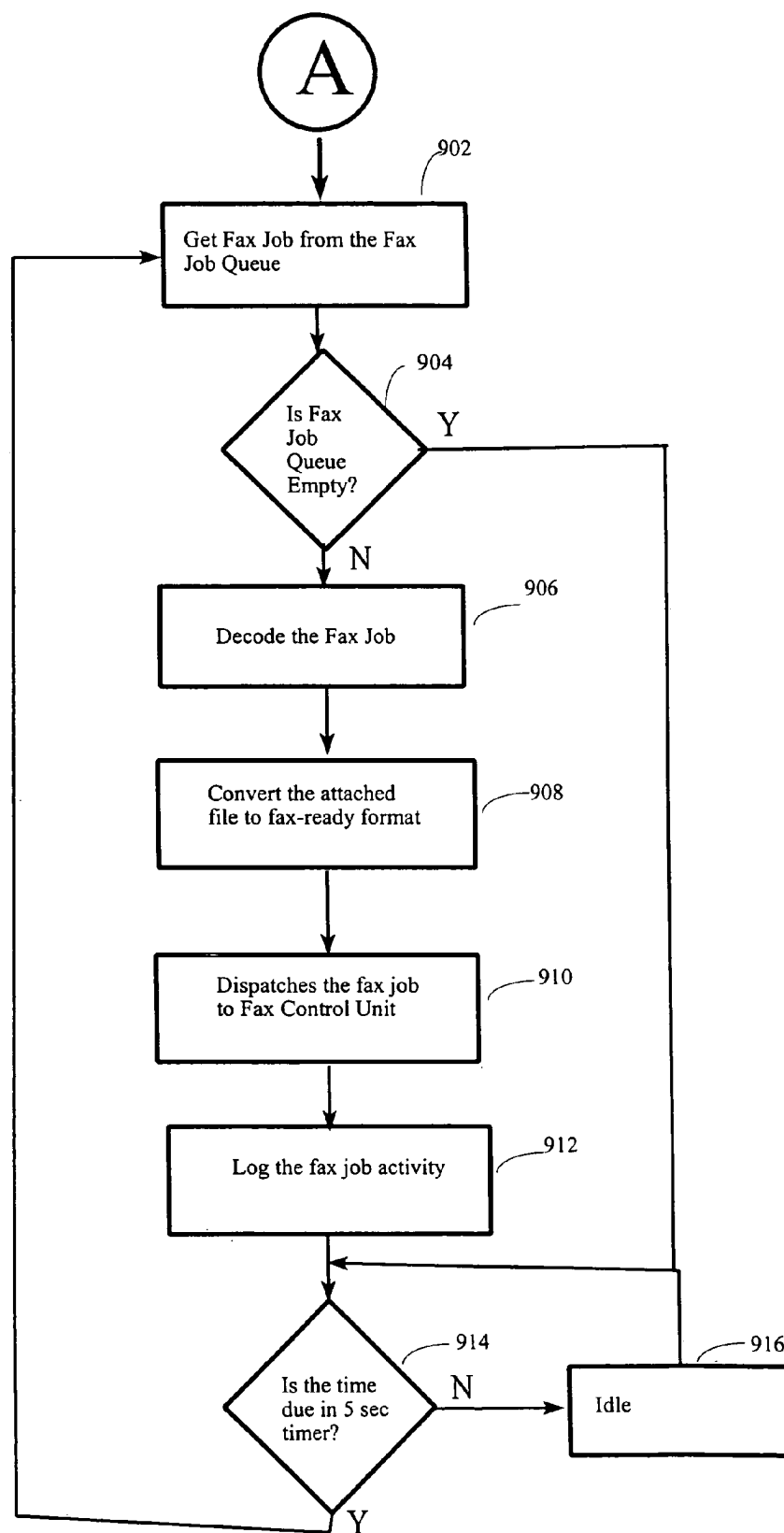
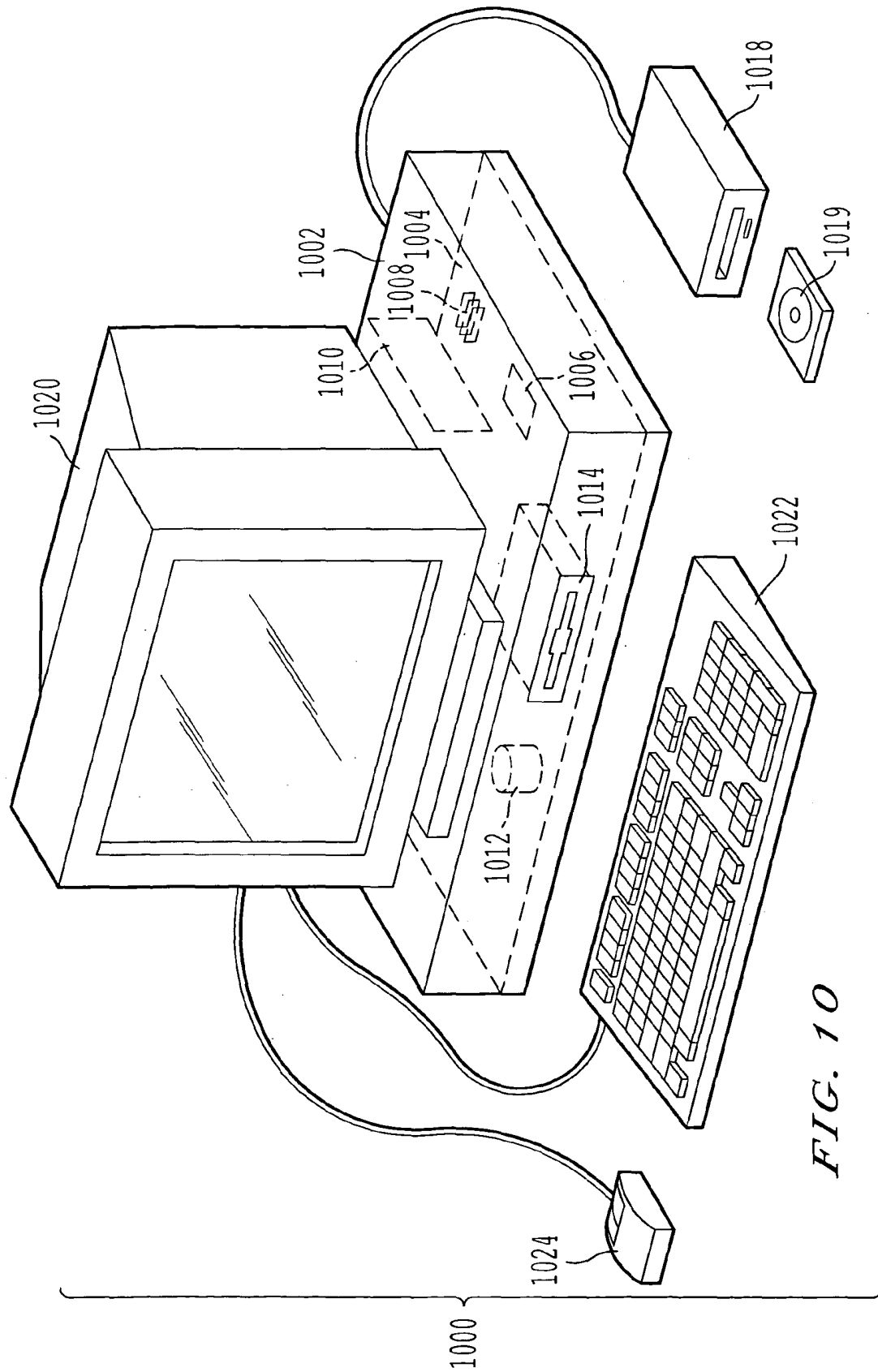


Figure 9



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NETWORK FAX MACHINE USING A WEB PAGE AS A USER INTERFACE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to a network fax machine and more specifically to an embedded fax server that faxes files received from a remote client.

2. Discussion of the Background

A conventional fax machine requires a user to leave his or her desk to physically carry a document to be faxed to the fax machine. Since many documents are stored electronically, methods for sending faxes from a personal computer (PC) have been developed. This has eliminated the requirement that users physically carry documents to be faxed to a fax machine, saving both time and money.

Examples of popular PC fax applications are Symantec Corp.'s WINFAX PRO 9.0 and the Computer Associates' BITWARE 4.0. PC fax applications permit documents electronically stored on a PC to be faxed via a modem attached to the PC. However, PC fax applications are for single users and are not a network fax solution. Additionally, PC fax software has to be individually installed on each PC, a modem is required for each PC, and users are required to connect their modem to a conventional public switched telecommunications network (PSTN) and set the modem settings.

Internet or local area network (LAN) fax machines, such as the Ricoh 4800L, can be connected to a LAN. Internet fax machines permit a client PC to send Group 3 (G3) fax messages to the Internet fax machine over the LAN. The Internet fax machine then sends the fax message to a destination such as a G3 fax machine connected to a PSTN or an e-mail address. However, conventional Internet fax machines require PC fax software such as WINFAX, and a COM redirector driver, which redirects fax messages from the PC fax software to an ETHERNET card rather than the COM port. Thus, use of conventional Internet fax machines requires installation of specialized software on each PC.

Windows NT and Unix fax servers have developed rapidly since the T.37 Internet Fax Standards were approved by the ITU-T (International Telecommunications Union-Telecommunications Sector) in June 1998. The T.37 recommendations define the service, file formats and addressing methods for the "Simple Mode" of Internet Fax via e-mail as RFCs (Request for Comments) 2301-2305. The Fax Server is usually directly integrated with the e-mail server and works as a gateway between Internet e-mail and G3 facsimile. The fax server retrieves the fax messages from the message queue of the e-mail server and sends the attachments as well as text messages to the destination via the PC fax modems. Some vendors (e.g., Biscom Corporation) have also developed Web page user interfaces for their fax servers. The fax server allows all network users to send and receive faxes right from their desktop. However, an extra workstation (e.g., NT or Unix workstation) is required to run the fax server. The addressing methods for Internet Fax is not intuitive and requires training in order to use Internet fax services. For example, the Internet fax message addressing syntax

"Fax=/num=1408-954-5353/name=John@faxserver.com" indicates that a fax is to be sent to 1408-954-5353. The intended receiver is John, and "faxserver.com" is the domain name of the fax server. Some fax servers are inconvenient to use because they require fax client software to be installed on each user's PC before he can use the fax services. The fax servers do not provide any

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means for a user to directly fax a hardcopy of a document to a fax number as a normal G3 fax machine does.

Printer servers have been implemented to allow administrative tasks to be remotely executed via a hyper text transfer protocol (HTTP) server resident on a printer. For example, Hewlett Packard's HP LaserJet 8100 series printers include HTTP servers. However, such HTTP servers are merely provided so that a user can access configuration and diagnosis information (e.g., network status, device identification, system configuration, security, diagnosis, and technical support) from a remote client connected to the HTTP server. Such HTTP servers do not provide direct printing services via a Web browser running on a client connected to the HTTP server.

SUMMARY OF THE INVENTION

Accordingly, one object of the present invention is to provide a novel network fax machine that includes a hyper text transfer protocol (HTTP) server.

Another object of the present invention is to provide a fax server, method, and software for providing a fax service through a Web page user interface.

It is yet another object of the present invention to provide a network fax machine having an HTTP server with a uniform resource locator (URL) that enables users to immediately access the network fax machine over a network such as the Internet, upon entering the URL at a client workstation.

It is an even further object of the present invention to provide a fax server, method, and software for sending fax messages through a network fax machine that eliminates the need for installing PC fax software and PC fax hardware, such as a fax modem.

It is still yet another object of the present invention to provide a fax server, method, and software which enables computers installed on a network to immediately access a network fax machine as soon as the network fax machine is installed on the network because the computers do not have to be altered.

These and other objects are achieved according to the present invention by providing a novel network fax machine, method, and software for faxing files received from a remote client. The network fax machine includes a server unit and a fax control unit. The server unit provides an HTML document form to a remote client and receives a fax request from the remote client. The fax request includes an identifier corresponding to a destination fax machine and zero or more attached files to be faxed to the destination fax machine. The fax control unit is configured to use the identifier to connect the network fax machine to the destination fax machine and is configured to send the file to the destination fax machine by facsimile communication. Since fax document forms are sent from the network fax machine to the client, there is no need to install fax software on the client. Further, there is no need to install fax hardware, such as a fax modem, if the client and server are connected by a network.

Preferably, the server unit is an HTTP server configured to serve a hypertext markup language (HTML) document to the remote client. In this case, the HTML document can include the fax document form sent to the remote client. Accordingly, the present invention provides a fax service through a Web page user interface. Moreover, the HTTP server has a URL, which permits users to immediately access the network fax machine over a network such as the Internet.

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In a preferred embodiment, the network fax machine includes a network interface card programmed to provide the HTTP server. Additionally, the network interface card can be programmed to provide a common gateway interface (CGI) application and a fax job manager. The CGI application is configured to read and parse the fax information received by the server unit, and the fax job manager is configured to convert the file to be faxed into a facsimile format.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the invention and many of the attendant advantages thereof will be readily obtained as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

FIG. 1 is a schematic illustration showing a Web fax server embedded in a G3 fax machine according to the present invention and in communication with a client or a PC running Web browser software;

FIG. 2 is a schematic illustration of an exemplary network on which the Web fax server of FIG. 1 can be implemented;

FIG. 3 is a schematic illustration of the internal components of the Web fax server of FIGS. 1 and 2 and of the interrelationship between the Web client, a public switched telecommunications network (PSTN), a normal G3 fax machine, and the internal components of the Web fax server;

FIG. 4 is a graphical user interface (GUI) for providing a fax document form as a Web page served to the Web client of FIGS. 1, 2, and 3 by the HTTP server of FIG. 3;

FIG. 5 is a GUI providing a fax job log as a Web page served to the Web client of FIGS. 1, 2, and 3, by the HTTP server of FIG. 3;

FIG. 6 is a flow chart explaining how fax requests are made and confirmed using the Web browser of FIG. 1 and the HTTP server of FIG. 3;

FIG. 7 is a flow chart explaining the operation of the common gateway interface (CGI) application used in the Web fax server of FIGS. 1, 2, and 3;

FIG. 8 is a flow chart explaining the operation of the parse client data module of the CGI application shown in FIG. 3;

FIG. 9 is a flow chart explaining the operation of the fax job manager used in the Web fax server of FIGS. 1, 2, and 3; and

FIG. 10 is a schematic diagram of a general purpose computer system that can be programmed to perform the special purpose function(s) of one or more of the devices shown in FIGS. 1, 2, and 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, and more particularly to FIG. 1 thereof, there is shown a Web fax server 102, a Web client 104, and an expanded screen shot 106 provided by a graphical user interface (GUI) of the Web client 104, using Web browser software. The terms "Web fax server" and "network fax machine" are used interchangeably to describe a fax machine that includes an embedded fax server.

The Web fax server 102 and the Web client 104 are connected and communicate in a client/server relationship. Thus, the Web fax server 102 and the Web client 104 can advantageously make use of distributed intelligence and processing. The Web fax server 102 performs all of the

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functions of a traditional fax machine. These traditional functions include scanning images from documents, converting the scanned images into digital data, sending the digital data to a fax machine over a network, receiving digital data from a fax machine, converting the digital data to an image, and printing the image on paper.

As shown in FIG. 1, the Web fax server 102 and the Web client 104 communicate using hypertext transfer protocol (HTTP); however, the Web fax server 102 and the Web client 104 may communicate using any suitable network protocol language or application level protocol for distributed systems. Preferably, the protocol used by the Web fax server 102 and the Web client 104 permits transfer of hyper medium information.

Accordingly, the present invention can be implemented on the World Wide Web or any other suitable network or medium for transferring files between a server and a client connected to a network. The design and implementation of various methods of database networking and Internet communications are described in Liu et al., "Managing Internet Information Services," O'Reilly & Associates, Inc., 1994; Comer, "Internet Working with TCP/IP Volume I: Principles, Protocols, and Architecture," 2nd ed., Prentice-Hall, Inc., 1991; Comer and Stevens, "Internet Working with TCP/IP Volume II: Design, Implementation, and Internals," Prentice-Hall, Inc., 1991; Comer and Stevens, "Internet Working with TCP/IP Vol. III: Client-Server Programming and Applications," Prentice-Hall, Inc., 1993; Khoshafian et al., "A Guide to Developing Client/Server SQL Applications," Morgan Kaufmann Publishers, Inc.; Hamilton et al., "JDBC Database Access with Java, A Tutorial and Annotated Reference," Addison-Wesley Pub. Co., 1997; and Francis et al., "Professional Active Server Pages 2.0," Wrox Press Ltd., 1998; each of which is incorporated by reference herein.

The Web client 104 is a personal computer (PC), mini-computer, workstation, or other computer or processor for sending information to the Web fax server 102 and for receiving files and other information from the Web fax server 102.

The display screen 106 is generated with a Web browser application or software running on the Web client 104. The Web browser application causes Web pages (or hypertext markup language (HTML) pages) downloaded from the Web fax server 102 to be displayed on the screen of the Web client 104.

FIG. 2 is an exemplary schematic diagram showing how the Web fax server 102 is integrated within an intranet 202. The intranet includes the Web client 104, a Web client 208, a Web client 210, a mail server 204, the Web fax server 102, and a proxy server 212.

The Web clients 208 and 210 are any processing device (e.g., a mini-computer, PC, or workstation) and can be the same or different from the Web client 104. As shown in FIG. 2, the intranet 202 also includes a mail server 204 and a proxy server 212 for interfacing the intranet 202 with the Internet 213. The Web client 104, the Web client 208, the Web client 210, the mail server 204, the proxy server 212, and the Web fax server 102 are all in communication with one another over the intranet 202. The Web fax server 102 is connected to a public-switched telephone network (PSTN) 214 and/or any other network or connection over which fax messages are transmitted.

Fax machines 216 and 218 are connected to the PSTN 214. The fax machines 216 and 218 are conventional fax machines or alternatively configured as Web fax servers, such as the Web fax server 102. The fax machines 216 and

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218 communicate with each other and the Web fax server 102, using Group 3 (G3) protocols or any other suitable protocol.

FIG. 3 is an exemplary schematic diagram of the Web fax server 102 and the connections between the Web client 104, the Web fax server 102, the PSTN 214, and the fax machine 216.

As noted above, the Web client 104 is a workstation, PC, computer, mini-computer, or other processing device that functions as a client in a client/server architecture arrangement. Web browser software or applications are running on the Web client 104 and provide a GUI for the user to enter fax requests. A fax request includes information such as the name of the intended recipient of the fax, the fax number of the destination fax, the e-mail address of the sender, the subject of the fax, a message, and zero or more attached files to be faxed to the destination fax machine. If zero files are attached, the user can still send text messages by typing text messages in the text message box of the field 410 (FIG. 4). The files to be faxed may be stored on the Web client 104 or remotely from the Web client 104. The Web client 104 preferably communicates with the Web fax machine 102 using HTTP protocol, as noted above.

In a preferred embodiment, the Web fax server 102 is a Ricoh 4800L fax machine that includes a network interface card (NIC) 302 and a fax control unit (FCU) 320.

The NIC card 302 is programmed to function as a Web server. The software used to program the NIC card 302 includes the following four software modules: an HTTP server 304; a common gateway interface (CGI) application 306; a fax job queue 308; and a fax job manager 310. The fax control unit 320 communicates with the fax job manager 310 and controls the delivery of fax messages to the fax machine 216 via the PSTN 214.

The HTTP server 304 supports connections with multiple clients (e.g., the Web client 104) and/or multiple Web browsers. The HTTP server 304 generates and sends a Web fax home page to the Web client 104. The Web fax home page is a fax document form used to collect fax information input by a user via a Web browser GUI. The HTTP server 304 also launches the CGI application 306 when fax information from the Web client 104 arrives at the HTTP server 304. Additionally, the HTTP server 304 sends back the server processing status to the Web client 104.

The CGI application 306 unpacks and processes fax information sent to the HTTP server 304 from the Web client 104. CGI is a known standard for external gateway programs to interface with information from servers. The CGI application could be written in any software language that can read standard input (STDIN), write to standard output (STDOUT), and read environment variables, for example. Thus, the CGI application could be written in C, C++, PERL, or with shell scripting, for example. The CGI application 306 reads streams of client data (e.g., fax information retrieved via the fax document form) through the standard input and parses the streams of client data. Additionally, the CGI application 306 stores variable values into data structures and writes the fax information (e.g., subject, message, and attached binary files) into temporary files. The attached binary files are the documents that are to be faxed from the web client. The CGI application 306 also enters fax messages, received as streams of client data from the HTTP server 304, into the fax job queue 308.

The fax job queue is an application, program, or a script implemented as a text file, for example. If the fax job queue 308 is a script implemented as a text file, then each fax job to be sent can be represented as a single line of the text file.

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Thus, each line in the text file corresponds to one fax job and contains at least eight fields. These fields are date, time, receiver's name, sender's email address, temporary subject file path and name, temporary message file path and name, temporary attached file path and name. The temporary files can be stored anywhere. By default, they would be stored in the same directory as the fax job queue file. For example, following is one line of text in the fax job queue file representing one fax job:

```
Nov. 30, 1999, 15:01:50, Sean Hou, 954-5353,
hou@fax.ussj.ricoh.com,
d:\Httpd\Faxjob\x00001.sub,
d:\Httpd\Faxjob\x00001.msg,
d:\Httpd\Faxjob\x00001.doc
```

The fields are separated by commas. The date is 11/30/99, the time is 15:01:50, and the intended receiver is Sean Hou. The destination fax number is 954-5353. The sender's email address is hou@fax.ussj.ricoh.com. The temporary subject file is d:\Httpd\Faxjob\x00001.sub. The temporary message file is d:\Httpd\Faxjob\x00001.msg. The temporary attached file is d:\Httpd\Faxjob\x00001.doc. The file extension ".sub" denotes the temporary subject file, which stores the subject the user entered in his fax request. The file extension ".msg" denotes the temporary message file, which stores the text message the user entered. The file extension ".doc" denotes the temporary MS Word file, which is attached to be faxed.

The fax job temporary files are automatically generated by the computer program. The program first tries to detect if fax00001.* exists or not. If yes, the temporary file name to be used by the next fax job is automatically advanced by 1. Thus, the temporary file name for the next fax job would be fax00002.sub, fax00002.msg, or fax00002.doc, for example, assuming fax00002.* does not already exist. If fax00002.* does exist, the next fax job temporary file name would be fax00003 plus the file extension. The fax job temporary files are continuously named in such a way until the last name fax99999 is designated. The fax job temporary files are immediately deleted once the fax job has been executed by the fax job manager 310, so that the same temporary file name will be immediately available for the next fax job to use. The fax job queue 308 operates on a first-in-first-out (FIFO) basis, so that new fax jobs are attached at the end of the fax job queue 308.

The fax job manager 310 includes the following software modules: a simple mail transfer protocol (SMTP) client 312, a file converter 314, a fax job dispatcher 316, and a fax job monitor 318. The fax job dispatcher 316 runs a fax job dispatching timer with a time interval. At the end of each time interval, the fax job dispatcher 316 reads the first fax job from the fax job queue 308. For example, if the time interval of the fax job dispatching timer is every five seconds, then every five seconds, the fax job dispatcher 316 reads the first fax job from the fax job queue 308.

The file converter 316 is a file conversion engine for converting different types of file formats into fax-ready formats. For example, the file converter 314 receives a Microsoft WORD file and then converts it to a Group 3 TIFF format file. The fax job dispatcher 316 uses the file converter 314 to translate an attached file into fax-ready format. Thus, a user may select any type of file to fax, for example, Microsoft WORD files, POWERPOINT files, EXCEL files, Adobe ACROBAT files, etc. File extensions are used by the file converter 314 to determine the type of file. After conversion, the fax job dispatcher 316 dispatches the fax job to the fax control unit 320.

The fax job monitor **318** keeps a log of fax job activities of the Web fax server **102** and generates for display a list of fax jobs that have been dispatched. The list of fax jobs are delivered to the Web client **104** in the form of a Web page, such as the fax job log **500** (FIG. 5). The fax job log **500** is preferably delivered to the user at the Web client **104** at the request of the user.

This invention includes the computer screen interface and the associated program used to generate the interface (e.g., a GUI), which is used for interaction with people (i.e., users) who are associated with and carry out the operation of the invention. For example, the inputs of the invention are entered through the user interface of the screen, and the outputs are displayed on the screen and/or generated on printed paper.

FIG. 4 is a GUI implemented as a Web fax home page **400**. The Web fax home page **400** is displayed by a Web browser, such as NETSCAPE, running on a client (e.g., the Web client **104**). The Web fax server home page **400** includes a field **402**, a field **404**, a field **406**, a field **408**, a field **410**, a field **412**, a field **414**, a field **416**, and a field **418**. The field **402** is for inputting the name of the receiver of the fax message. The field **404** is for inputting the telephone number of the fax machine of the receiver (i.e., the destination fax machine **216**). The field **406** is for inputting the e-mail address of the sender. The field **408** is for inputting the subject of the fax message. The field **410** includes a text message box for inputting a message and scroll bars for scrolling through messages that do not fit entirely within the message field. The field **412** is a button, which allows a user to browse a storage device connected to the Web client **104** for files to be sent as fax messages. Such storage devices may include hard disk drives, floppy disk drives, network databases, or any other suitable medium for storing files to be sent by facsimile communication to the fax machine **216**. The field **414** is for manually inputting a file to be faxed. The field **416** clears the inputs contained in the fields **402**, **404**, **406**, **408**, **410** and **414**. The field **418** is a button, which when selected, causes the fax message, including fax information to be sent to the HTTP server **304** from the Web client **104**.

FIG. 5 shows a fax job log **500** sent to the Web client **104** from the HTTP server **304** in the form of a Web page. The fax job log **500** includes a field **502**, a field **504**, a field **506**, a field **508**, a field **510**, a field **512**, a field **514**, a field **516**, and a field **518**, which are arranged in a single record. The field **502** displays the fax job number. The field **504** displays the status of the fax job (e.g., whether the fax message was sent successfully by the fax control unit **320** or whether an error occurred). The field **506** displays the date that the fax was sent by the fax control unit **320**. The field **508** displays the time that the fax message was sent by the fax control unit **320**. The field **510** displays the name of the intended receiver of the fax message. The field **512** displays the fax number of the destination fax machine **216**. The field **514** displays the e-mail address of the sender. The field **516** displays the fax job ID. The fax job ID is used in generating the temporary fax job files for a particular fax job, which is useful for software debugging. The field **518** displays comments, if any, corresponding to each fax job number stored in the field **502**. Thus, as shown in FIG. 5, fax job number 0005 was sent Sep. 28, 1999, at 17:31:30 to John at fax number 434-4390. The sender's e-mail was hou@fax.ussj.rioh.com. As shown in field **504**, an error occurred, and the fax job ID displayed in field **516** is fax00001. In the field **518** the error message "ERR=01" is displayed, indicating that the error code for the

error is 01. The error code 01 corresponds to a particular type of error identified in a manual or on an on line help screen, for example.

FIG. 6 is a flowchart showing how the Web client **104** and the HTTP server **304** operate in parallel to provide a Web fax service. Steps **602**, **604**, **606**, **608**, **610**, and **612** are performed on the Web client **104**, which is preferably an HTTP client running Web browser software that displays Web pages served by the Web fax server **102**. Steps **614**, **616**, **618**, **620**, **621**, and **622** are performed by the HTTP server **304**.

First, the processing of the Web client **104** is described. In step **602** a user at the Web client **104** enters the URL or IP Address corresponding to the Web fax server **102**. Once the Enter button is pressed in step **602**, the Web client **104** will attempt to connect to the HTTP server **304** of the Web fax server **102**. Once the Web client **104** connects to the HTTP server **304**, the Web client **104** displays a fax document form (e.g., the Web fax home page **400**) received from the HTTP server **304**. Then, in step **606** the user enters information into some or all of the fields **402**, **404**, **406**, **408**, **410**, and **414** displayed on the Web fax home page **400**.

The user sends the information input in step **606** to the HTTP server by selecting (i.e., clicking on) the button in field **418** of the Web fax home page **400**. After the user input data is received and processed by the HTTP server **304**, in step **610** the Web client **104** displays the response of the HTTP server **304**. Such responses include an indication whether the fax request was successfully received. The user will receive an e-mail reporting his fax status if he has entered his e-mail address into the field **406**. In step **612**, the user is prompted by the Web client **104** whether there are additional fax messages to be sent. Such prompting can be performed with a Web page sent to the Web client **104** from the HTTP server **304**. If the user has finished sending fax messages, then the process ends. If the user indicates that additional fax messages are to be sent, then the process returns to step **604**.

Next, the processing of the HTTP server **304** is described with reference to steps **614**, **618**, **620**, **621**, and **622**. In step **614**, the HTTP server **304** is idle and waits for a connection. Upon receiving a request for a connection from the Web client **104**, the HTTP server **304** connects to the Web client **104** and sends the Web fax home page **400** to the Web client **104**. In step **620** the HTTP server **304** receives user input data including information such as the receiver's name, the receiver's fax number, the subject of the fax, and/or any other information input by the user into the Web fax home page **400** in step **606**. After receiving the user input data in step **620**, the HTTP server **304** launches the CGI application **306** in step **621**. The CGI application **306** is described in further detail below with reference to FIG. 7. In step **622**, the HTTP server **304** generates the server response and sends the server response to the Web client **104** in the form of a Web page. Then, the process returns to step **614**.

FIG. 7 is a flowchart explaining the operation of the CGI application **306**. The CGI application **306** is programmed and implemented using any suitable compiler, such as a C++ compiler. In step **702**, the CGI application **306** determines the size of the client data in bytes. The size of the client data in bytes is represented by the environment variable CONTENT_LENGTH. If a C++ compiler is used, the original value of content length is a character string obtained through the standard library call getenv(). Then, the string value of CONTENT_LENGTH is converted to an unsigned long integer using the standard library call atoi().

In step **704**, the CGI application **306** compares the integer value of CONTENT_LENGTH to zero. If the integer value

of CONTENT_LENGTH (i.e., the client data size in bytes) equals zero, then a "no data error" message is reported to the HTTP server **304** in step **706**. If the integer value of CONTENT_LENGTH is greater than zero, then in step **708** the CGI application **306** allocates a memory buffer of a size at least as great as the client data size. Then, in step **710** the CGI application **306** determines whether the allocation of the memory buffer was successful. If the allocation of the memory buffer is unsuccessful, then in step **712** the CGI application **306** generates a "memory allocation error" message, which is sent to the HTTP server **304**. If the allocation of the memory buffer is successful, then in step **714** the CGI application **306** calls a low level I/O routine to read the client data from the standard input. Once the client data is read into the memory buffer, the memory buffer is passed as a parameter to a parse client data module, which is described in further detail below with reference to FIG. **8**. If the CGI application **306** is unsuccessful in parsing the client data, then in step **720** a "parse client data error" message is generated and sent to the HTTP server **304**. If the CGI application **306** successfully parses the client data, then in step **724** the CGI application generates a server response, which is preferably in HTML. As noted above, in step **622** (FIG. **6**) the HTTP server **304** sends the server response to the user to the Web client **104**, which displays the server response in step **610**.

FIG. **8** is a flowchart showing how the parse client data module **307** of the CGI application **306** parses client data. The present example assumes that client data is received in a stream separated by "name=" substrings. In step **802**, parse client data module **307** finds the next "name=" substring in the client data stream. In step **804**, the parse client data module **307** determines whether a "name=" substring was found in the client data stream. If a "name=" substring is not found in the client data, then the process ends. If a "name=" substring is found in the client data stream, then in step **806** the parse client data module **307** retrieves the value of the variable name. Then, in step **808** the parse client data module **307** identifies the value corresponding to the variable name in the client data stream and stores the variable value in any suitable data structure. In step **810**, the parse client data module **307** determines whether the variable value of the name is a file name. If the variable value is not a file name, then in step **812** the parse client data module **307** saves the variable value in a data structure, and the process returns to step **802**. If the parse client data module **307** determines that the variable value retrieved in step **808** is a file name, then in step **814** the parse client data module **307** generates a fax job file name. Then, in step **816** the parse client data module **307** unpacks the file associated with the file name and stores the client data into temporary fax job files. Then, in step **818** the parse client data module **307** enters the user's fax request into the fax job queue. Thus, the parse client data module **307** opens the fax job queue file and appends a new line of text in that file.

FIG. **9** is a flowchart showing the processing performed by the fax job manager **310** after one or more fax jobs are entered into the fax job queue **308** in step **818**. In step **902**, the fax job dispatcher **316** reads the fax job queue file and retrieves the first fax job from the fax job queue **308**. Then, in step **904** the fax job manager **310** determines whether the fax job queue **308** is empty. If the fax job queue **308** is not empty, in step **908** the file converter **314** decodes the fax job in step **906** and converts the attached file to a fax ready format. Then, in step **910**, the fax job dispatcher **316** dispatches the fax job to the fax control unit **320**. Additionally, the SMTP client **312** sends back the fax job processing

status (e.g., "successfully sent," "error," etc.) to the e-mail address (in the field **406**) of the user of the Web client **104**. In step **912** the fax job monitor logs the fax job log **500**.

Then, in step **914**, the fax job dispatcher **316** determines whether the predetermined time interval has expired. If the predetermined time interval has not expired, then in step **916** the fax job dispatcher **316** remains idle. If the predetermined time interval has expired then the process returns to step **902** and the fax job dispatcher **316** retrieves the first fax job from the fax job queue **308**. Referring back to step **904**, if the fax job dispatcher **316** determines that the fax job queue **308** is empty, then the process proceeds to step **914** and the fax job dispatcher **316** remains idle until the next predetermined time interval has expired.

All or a portion of the invention may be conveniently implemented using conventional general purpose computers or microprocessors programmed according to the teachings of the present invention, as will be apparent to those skilled in the computer art. Appropriate software can be readily prepared by programmers of ordinary skill based on the teachings of the present disclosure, as will be apparent to those skilled in the software art.

FIG. **10** is a schematic illustration of a computer system **1000** for implementing the method of the present invention. The computer system **1000** includes a computer housing **1002** for housing a mother board **1004**, which contains a CPU **1006**, a memory **1008** (e.g., random access memory (RAM) dynamic RAM (DRAM), static RAM (SRAM), synchronous DRAM (SDRAM), flash RAM, read-only memory (ROM), programmable ROM (PROM), erasable PROM (EPROM), and electrically erasable PROM (EEPROM)), and other optional special purpose logic devices (e.g., application specific integrated circuits (ASICs)) or configurable logic devices (e.g., generic array of logic (GAL) or reprogrammable field programmable gate arrays (FPGAs)). The computer system **1000** also includes plural input devices, such as a keyboard **1022** and a mouse **1024**, and a display card **1010** for controlling a monitor **1020**. In addition, the computer system **1000** further includes a floppy disk drive **1014**; other removable media devices (e.g., a compact disc **1019**, a tape, and a removable magneto-optical media); and a hard disk **1012**, or other fixed, high density media drives, connected using an appropriate device bus (e.g., a small computer system interface (SCSI) bus, and enhanced integrated device electronics (IDE) bus, or an ultra-direct memory access (DMA) bus). The computer system **1000** may additionally include a compact disc reader **1018**, a compact disc reader-writer unit, or a compact disc juke box, each of which may be connected to the same device bus or another device bus. Although the compact disc **1019** is shown in a CD caddy, the compact disc **1019** can be inserted directly into CD-ROM drives which do not require caddies. In addition, a printer may provide printed listings of the information shown in FIGS. **4** and **5** or any other data stored and/or generated by the computer system **1000**.

As stated above, the system includes at least one computer readable medium or memory programmed according to the teachings of the invention and for containing data structures, tables, records, or other data described herein. Examples of computer readable media are compact discs, hard disks, floppy disks, tape, magneto-optical disks, PROMs (EPROM, EEPROM, Flash EPROM), DRAM, SRAM, SDRAM, etc. Stored on any one or on a combination of computer readable media, the present invention includes software for controlling both the hardware of the computer **1000** and for enabling the computer **1000** to interact with a human user (e.g., a consumer). Such software may include,

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but is not limited to, device drivers, operating systems and user applications, such as development tools. Such computer readable media further includes the computer program product of the present invention for performing all or a portion (if processing is distributed) of the processing performed in implementing the invention. The computer code devices of the present invention can be any interpreted or executable code mechanism, including but not limited to scripts, interpreters, dynamic link libraries, Java classes, and complete executable programs. Moreover, parts of the processing of the present invention may be distributed for better performance, reliability, and/or cost. Preferably the computer system 1000 runs a browser application for displaying HTML documents provided by the Web fax server 102.

The invention may also be implemented by the preparation of application specific integrated circuits or by interconnecting an appropriate network of conventional component circuits, as will be readily apparent to those skilled in the art.

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

The invention claimed is:

1. A network fax machine for faxing files received from a remote client, comprising:

a server unit configured to send a fax document form to a remote client over a network using an HTTP communication protocol and configured to receive fax information entered using a Web browser on said fax document form from the remote client using the HTTP communication protocol, the fax information including (1) an identifier identifying a destination fax machine, and (2) a file stored on the remote client to be faxed to the destination fax machine; and

a fax control unit configured to use the identifier to connect the network fax machine to the destination fax machine and configured to send the file to the destination fax machine by facsimile communication, wherein the destination fax machine is located remotely from the remote client.

2. A network fax machine according to claim 1, wherein the server unit comprises:

a hypertext transfer protocol server configured to serve a hypertext markup language document to the remote client, the hypertext markup language document including the fax document form.

3. A network fax machine according to claim 1, further comprising:

a network adapter, the network adapter including the server unit.

4. A network fax machine according to claim 3, wherein the network adapter comprises:

a network interface card.

5. A network fax machine according to claim 1, wherein the fax control unit is configured to connect to a public switched telephone network and is configured to send the file to the destination fax machine via the public switched telephone network.

6. A network fax machine according to claim 1, further comprising:

a common gateway interface configured to read and parse the fax information received by the server unit.

7. A network fax machine according to claim 6, further comprising:

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a fax job manager configured to convert the file to be faxed into a facsimile format.

8. A method for faxing files received from a remote client, comprising:

5 sending a fax document form to a remote client over a network using an HTTP communication protocol;

receiving, by a network fax machine, fax information entered using a Web browser on said fax document form from the remote client using the HTTP communication protocol, the fax information including (1) an identifier identifying a destination fax machine, and (2) a file stored on the remote client to be faxed to the destination fax machine;

connecting the network fax machine to the destination fax machine using the identifier; and

10 sending the file to the destination fax machine by facsimile communication, wherein the destination fax machine is located remotely from the remote client.

9. A method according to claim 8, wherein the step of

20 sending comprises:

serving a hypertext markup language document to the remote client, the hypertext markup language document including the fax document form.

10. A method according to claim 8, wherein the step of

25 connecting comprises:

connecting to a public switched telephone network; and wherein the step of sending comprises:

30 sending the file to the destination fax machine via the public switched telephone network.

11. A method according to claim 8, further comprising the step of:

reading and parsing the fax information received from the remote client.

12. A method according to claim 11, further comprising the step of:

35 converting the file to be faxed into a facsimile format.

13. A network fax machine for faxing files received from a remote client, comprising:

40 means for sending a fax document form to a remote client over a network using an HTTP communication protocol;

means for receiving fax information entered using a Web browser on said fax document form from the remote client using the HTTP communication protocol, the fax information including (1) an identifier identifying a destination fax machine, and (2) a file stored on the remote client to be faxed to the destination fax machine;

means for connecting the network fax machine to the destination fax machine using the identifier; and

45 means for sending the file to the destination fax machine by facsimile communication, wherein the destination fax machine is located remotely from the remote client.

14. A network fax machine according to claim 13,

55 wherein the means for sending a fax document form to a remote client and for receiving fax information from the remote client comprises:

means for serving a hypertext markup language document to the remote client, the hypertext markup language document including the fax document form.

15. A network fax machine according to claim 13, wherein the means for connecting the network fax machine to the destination fax machine comprises:

means for connecting the network fax machine to a public switched telephone network; and wherein the means for sending the file to the destination fax machine by facsimile communication comprises:

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means for sending the file to the destination fax machine via the public switched telephone network.

16. A network fax machine according to claim **13**, further comprising:

means for reading and parsing the fax information 5 received by the means for receiving.

17. A network fax machine according to claim **16**, further comprising:

means for converting the file to be faxed into a facsimile format.

18. A computer readable medium containing program instructions for execution on a computer system, which when executed by a network fax machine, cause the network fax machine to perform method steps for faxing files received from a remote client, said method comprising the 15 steps of:

sending a fax document form to a remote client over a network using an HTTP communication protocol;

receiving fax information entered using a Web browser on said fax document form from the remote client using 20 the HTTP communication protocol, the fax information including (1) an identifier identifying a destination fax machine, and (2) a file stored on the remote client to be faxed to the destination fax machine;

connecting the network fax machine to the destination fax 25 machine using the identifier; and

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sending the file to the destination fax machine by facsimile communication, wherein the destination fax machine is located remotely from the remote client and the remote client.

19. A computer readable medium according to claim **18**, wherein the step of sending comprises:

serving a hypertext markup language document to the remote client, the hypertext markup language document including the fax document form.

20. A computer readable medium according to claim **18**, wherein the step of connecting comprises:

connecting to a public switched telephone network; and wherein the step of sending comprises:

sending the file to the destination fax machine via the public switched telephone network.

21. A computer readable medium according to claim **18**, further comprising program instructions for causing the computer to perform the step of:

reading and parsing the fax information received from the remote client.

22. A computer readable medium according to claim **21**, further comprising program instructions for causing the computer to perform the step of

converting the file to be faxed into a facsimile format.

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UNITED STATES PATENT APPLICATION

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**METHOD SYSTEM AND APPARATUS FOR SCRIPTABLE
MULTIFUNCTION DEVICE CONTROLLER**

METHOD SYSTEM AND APPARATUS FOR SCRIPTABLE MULTIFUNCTION DEVICE CONTROLLER

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] This invention relates to multifunction devices such as, but not limited to, devices that integrate facsimile, scanner, copier, and printer function, and more particularly relates to multifunction devices with self-contained scriptability and application integration.

DESCRIPTION OF THE RELATED ART

[0002] In order to minimize equipment costs, multifunction devices have begun to replace traditional office printers, copiers, scanners, and fax machines. Currently, multifunction devices may have a direct cable or network connection to a server or desktop computer. Using software residing on the computer or server, the multifunction device is adaptable to many applications. For example, a multifunction device may be used for processing many business related documents such as payroll, contracts, expense accounts, and human resource applications, to name a few. Businesses have invested large amounts of time and resources into systems designed to streamline the examples given. However, the effectiveness of such a centralized business application processing system is reduced when paper is involved.

[0003] Previously, for example, a user wanting reimbursement for a business expense would approach a multifunction device, scan in the receipt, send that scanned document to his or her computer, and then submit that scanned document to an expense administrator to be processed. Additionally, many users may share one multifunction device and therefore a user may be required to walk to the other side of the building, scan a document, and return to his or her desk and hope that the document was properly sent. This type of solution is not cost effective. Alternative solutions require a separate server for processing the expense

information. For example, the server may be required to identify the user and what the user is trying to accomplish.

[0004] Additionally, conventional multifunction devices are generally based upon proprietary device controllers and small touch screen user interfaces. The device controllers are hardwired into the multifunction device and offer little, if any, flexibility or upgradeability for new or improved business applications. The small touch screen user interface creates difficulty when a user desires to send a scanned or copied document to a remote location via fax or email because the touch screen buttons are small and few in number.

[0005] What is needed is a process, apparatus, and system for a multifunction device that is modifiable to multiple business applications and has self-contained application integration. Such a process, apparatus, and system would be even more beneficial if provided with a scriptable, integrated user interface.

BRIEF SUMMARY OF THE INVENTION

[0006] The present invention has been developed in response to the present state of the art, and in particular, in response to the problems and needs in the art that have not yet been fully solved by currently available multifunction devices. Accordingly, the present invention has been developed to provide a process, apparatus, and system that overcome many or all of the above-discussed shortcomings in the art.

[0007] The apparatus of the present invention is a standalone multifunction device comprising a user interface module that is modifiable and configured to adapt to a plurality of business application interfaces. A controller module is scriptable and configured to control the operation of the multifunction device and interface with business applications. An input device incorporating a graphical user interface is provided as well as a source interface module configured to receive input data from at least one document data source and a target interface module configured to output processed document data.

[0008] In one embodiment, the multifunction device may also comprise a plurality of application integration modules configured to interface with the scriptable multifunction device controller and provide input and output fields to the modifiable user interface module. Additionally, the application integration modules may be configured to interface with a specified business application. In one embodiment of the present invention, the multifunction device may also comprise a scanning device configured to transmit document data to the source interface. Furthermore, the multifunction device may comprise a printing device configured to receive document data from the target interface.

[0009] The multifunction device may also comprise a communications module configured to transmit and receive data over a plurality of data communication connections. In certain embodiments, the communications module may be configured to output processed document data as a facsimile or as an e-mail. Alternatively, the communications module may be configured to output processed document data to an external device such as a server or separate fax machine.

[0010] In one embodiment of the present invention, a networked system is provided. The network may comprise a server, a multifunction device, a multifunction device interface module configured to communicate with a plurality of multifunction devices over a data communications network, a facsimile module configured to send facsimiles, and an e-mail module configured to send e-mails. Additionally, the facsimile module may comprise a facsimile apparatus configured to communicate with the server over a data communications network. Also, the e-mail module may comprise an e-mail server configured to communicate with the server over a data communications network.

[0011] The present invention may also comprise a method for document management. In one embodiment, the method comprises providing a multifunction device with a scriptable user interface module, identifying a user, accessing a business application interface, receiving user information, inputting document data, confirming information, interfacing with a business application, submitting document data to the business application, and providing a final confirmation to the user. Identifying a user may comprise using an identification card or requiring that the user enter a username and password. In one embodiment, the method further comprises previewing the data to be submitted before interfacing with the chosen business application.

[0012] The invention may also comprise a computer readable storage medium comprising computer readable code configured to carry out a process for business document management. In one embodiment, the process may comprise identifying a user, choosing a business application interface, entering user information, inputting document data, interfacing with business application, submitting document data to the business application, and providing final success or failure confirmation to the user.

[0013] These features and advantages of the present invention will become more fully apparent from the following description and appended claims, or may be learned by the practice of the invention as set forth hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] In order that the advantages of the invention will be readily understood, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments that are illustrated in the appended drawings. Understanding that these drawings depict only typical embodiments of the invention and are not therefore to be considered to be limiting of its scope, the invention will be described and explained with additional specificity and detail through the use of the accompanying drawings, in which:

[0015] Figure 1 is a schematic block diagram illustrating one embodiment of a multifunction device system in accordance with the present invention;

[0016] Figure 2 is a schematic block diagram illustrating one embodiment of a multifunction device controller module in accordance with the present invention;

[0017] Figure 3 is a schematic flow chart diagram illustrating one embodiment of a method of operation of the multifunction device in accordance with the present invention;

[0018] Figures 4a and 4b are schematic flow chart diagrams illustrating one embodiment of a method of use of the multifunction device in accordance with the present invention; and

[0019] Figures 5-10 are schematic block diagrams illustrating examples of screens displayed to a user of the multifunction device in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0020] Many of the functional units described in this specification have been labeled as modules, in order to more particularly emphasize their implementation independence. For example, a module may be implemented as a hardware circuit comprising custom VLSI circuits or gate arrays, off-the-shelf semiconductors such as logic chips, transistors, or other discrete components. A module may also be implemented in programmable hardware devices such as field programmable gate arrays, programmable array logic, programmable logic devices or the like.

[0021] Modules may also be implemented in software for execution by various types of processors. An identified module of executable code may, for instance, comprise one or more physical or logical blocks of computer instructions which may, for instance, be organized as an object, procedure, or function. Nevertheless, the executables of an identified module need not be physically located together, but may comprise disparate instructions stored in different locations which, when joined logically together, comprise the module and achieve the stated purpose for the module.

[0022] Indeed, a module of executable code could be a single instruction, or many instructions, and may even be distributed over several different code segments, among different programs, and across several memory devices. Similarly, operational data may be identified and illustrated herein within modules, and may be embodied in any suitable form and organized within any suitable type of data structure. The operational data may be collected as a single data set, or may be distributed over different locations including over different storage devices, and may exist, at least partially, merely as electronic signals on a system or network.

[0023] Referring now to Figure 1, shown therein is a schematic block diagram illustrating one embodiment of a system 100 incorporating a standalone multifunction device (MFD) 101 of the present invention. As defined herein, a standalone multifunction device 101 refers to a multifunction device configured for interfacing with a user and an application

without the need of a computer for processing document information. In one embodiment, the standalone multifunction device 101 comprises a MFD controller 102, a plurality of data communication channels 103, a printer 104, and an input device incorporating a graphical user interface (GUI) 108. Additionally, the standalone multifunction device 101 may be connected to a computer network 107. The MFD controller 102 is configured to communicate with the scanner 106 and the graphical user interface 108 over any suitable communication channels 103, such as a local area network, serial or parallel interface, or the like. In one embodiment of the present invention, the communication channel 103 may comprise a SCSI interface, which is well documented and known to those skilled in the art.

[0024] The printer 104 may be coupled separately to the global communications network 107 so that it may be accessed from other document sources, such as additional multifunction devices 101. The MFD controller 102 is also preferably coupled to the computer network 107 and is configured to utilize scanning, printing, copying, and sending capabilities of other multifunction devices 101. The computer network 107 may be a global communications network such as the Internet or a local area network, wide area network, or the like. Additionally, optional services 110, 112 may be available on the computer network 107. The optional services may include, but are not limited to, remote printers 110, e-mail, facsimile, directory, security, and library services and data storage services.

[0025] The scanner 106 and printer 104 may be any commercially available devices using industry standard interfaces to the MFD controller 102. In one embodiment, this provides an advantage in that the MFD controller 102 may be easily integrated with scanning and printing devices already in place.

[0026] The graphical user interface 108 may be configured as a touch screen LCD (not shown), or alternatively the graphical user interface 108 may be configured with common human interface devices such as a light pen, a keyboard and/or a mouse (not shown). The graphical user interface 108 may be configured to communicate with the MFD controller 102 over the data communication channel 103. Additionally, the graphical user

interface 108 may be configured to communicate user commands to the MFD controller 102.

Such commands might include, but are not limited to, user identification, scanning, faxing, emailing, copying, and submitting business related documents.

[0027] Figure 2 is a schematic block diagram illustrating one embodiment of the standalone multifunction device 101. Shown therein are the MFD controller 102, the printer 104, the scanner 106, and the graphical user interface 108 of Figure 1. Optional external modules include a fax module 202 and an email module 204. In the depicted embodiment, the fax module 202 and the email module 204 may be internal, application-based services configured to communicate with the MFD controller 102. Alternatively, the fax module 202 and the email module 204 may comprise remote fax and email devices configured to communicate with the MFD controller 102 over a data communication network (not shown), such as the data communication channels 103 of Figure 1.

[0028] In one embodiment of the present invention, the MFD controller 102 comprises a user identification module 206, a user input module 208, a plurality of application integrator modules 210, a user interface (UI) definition module 212, a UI toolkit 214, a script engine module 216, and a UI module 218. The user identification module 206 may be configured as an externally coupled identification card reader configured to receive an identification card from a user and compare the user information to a local database (not shown) or remote database 112. Alternatively, the user identification module 206 may comprise, but is not limited to, a retinal scanner, fingerprint biometric system, or badge scanner. In one embodiment, the user identification module 206 may be configured to communicate with the script engine module 216 and cause a login screen to appear on the graphical user interface 108.

[0029] In a further embodiment, the user input module 208 may be configured to receive user commands from the graphical user interface 108. In one embodiment, the user input module 208 is further configured to communicate the user commands with the user interface toolkit 214.

[0030] One advantage of the present invention is the modifiability of the application integrator modules 210. A user may configure an application integrator 210 to operate as both document data input and output. For example, one application integrator module 210 may be configured as an integrated business expense application, with the ability to communicate with the script engine module 216 and thereby display an appropriate user interface on the graphical user interface 108. Different embodiments of such user interfaces will be explained with greater detail below with reference to Figures 5-10.

[0031] Additionally, the application integrator modules 210 may be configured to receive processed document data from the script engine module 216 and output the processed document data. In one embodiment, an application integrator module 210 may emulate a fax machine and send processed document data to a remote fax server (not shown). Alternatively, the application integrator module 210 may be configured as a communications module to send messages or e-mails over a data communications network such as the global communications network 107 of Figure 1.

[0032] In one embodiment, the plurality of application integrators 210 is configurable as upgradeable applications operating within the standalone multifunction device 101. For example, the user may develop proprietary business application interfaces and load these interfaces onto the standalone multifunction device 101 through a management port (not shown). Alternatively, the interfaces may be loaded over data communication channels 103. In a further embodiment, the user may download and install a plurality of application integrators 210 from a global communications network.

[0033] One advantage of the present invention is the ability to modify the standalone multifunction device 101 to interface with a specific application. The user may configure the standalone multifunction device 101 by modifying the user interface definition module 212 and the user interface module 218. In one embodiment, the user interface definition module 212 and the user interface module 218 may be configured to receive user defined scripts or programs in order to modify the standalone multifunction device 101. For example, the user

definition module 212 may be configured to store a plurality of data objects. These data objects may be proprietary and business application specific. Additionally, the user interface module 218 may be configured to receive, store, and execute programs created in Java, C++, or the like.

[0034] In a further embodiment, the user interface toolkit 214 is configured to communicate with the user interface definition module 212 and the user input module 210 in order to communicate user commands into the script engine module 216. Additionally, the user interface module 218 may be configured with user commands, programs, scripts, or the like, in order to modify the functionality of the standalone multifunction device 101.

[0035] Referring now to Figure 3, shown therein is a schematic flow chart diagram illustrating one embodiment of a method 300 for controlling the standalone multifunction device 101. The method 300 starts 302 and user definitions are received 304. In one embodiment, the standalone multifunction device 101 is configured to receive user definitions through, but is not limited to, a management port (not shown) or over the data communications network 107. Once the definitions are received 304, the multifunction device may then be configured 306 with the plurality of application integrator modules 210. For example, application integrator modules 210 may be configured 306 as integrated programs designed for payroll, contracting, expense accounting, human resource managing, document presenting, document submitting, etc.

[0036] The standalone multifunction device 101 may now identify 308 a user. In one embodiment, the user is identified 304 as described previously with reference to module 206 of Figure 2. An application is chosen 310, and the standalone multifunction device 101 receives 312 user information. The user information may comprise job, account, or personal data. The standalone multifunction device 101 then receives 314 document data. Document data may be received 314 from the scanner 106 or from remote devices. In one embodiment, a remote device may comprise other multifunction devices 101. After receiving 314 the document data, the multifunction device confirms 316 the action the user desires to effect.

The standalone multifunction device 101 may then interface 318 with the chosen application and then submit 320 the document data. Final confirmation is provided 322 by the standalone multifunction device 101, and the user may choose to input 324 another document, or alternatively terminate 326 the session.

[0037] Figures 4a and 4b together illustrate one method 400 of user control of the standalone multifunction device 101. First, a user approaches 402 the standalone multifunction device 101, and the user sets 404 the parameters for a particular job. In one embodiment, setting the parameters 404 comprises selecting and setting parameters for one or a plurality of job types. The job types or options that can be selected using the GUI 108 include, but are not limited to, scanning 406, copy/printing 408, faxing 410, e-mailing 412, and accessing a library 414. Additionally, a user may select more than one option while performing a single job. For example, the user may scan 406 a document, as well as print 408, fax 410 and then e-mail 412 the scanned document. Alternatively, the user could select the archive 414 to access a particular form, and subsequently print 408 the selected form.

[0038] When selecting scanning 406 or copying/printing 408, the user may further define a number of job parameters, or, alternatively the user may simply use default parameters. The user-settable job parameters include, but are not limited to quality 416, e.g. text or image/text, exposure 418, number of sides 420, number of copies 422, paper tray 424, e.g., letter/legal, and staple options 426. While not specifically indicated in Figures 4a and 4b, the various scan options can preferably be set at any time, such as when setting copy, fax, e-mail and archive options. A user may select 416-426 none, one, some or all of the options while performing a particular job. After making a selection, the user then starts 428 the job, or resets 428 the job at which point the method 400 starts again at block 402.

[0039] If the user selects the fax 410, the GUI 108 displays appropriate selection fields where the user may enter 431 a fax number. Alternatively, the user may search 432 a directory database 112 for the fax number, and select 433 a recipient from the search results. The user may then start or cancel 428 the job. Alternatively, if the user selects e-mail 412, the GUI 108

displays appropriate selection fields wherein the user may choose 434 to enter 435 an e-mail address or search 432 as described above. The user may then start or cancel 428 the job. Finally, if the user selects the library 414, the user may select 436 a form from the list of forms maintained by the database 112. The user may then print 408, fax 410, or email 412 the selected form.

[0040] Figures 5-10 are schematic block diagrams showing multiple embodiments of the GUI 108 of the standalone multifunction device 101. In Fig. 5, the copy/print tab 502 is shown as selected. A user accustomed to the art will recognize the scanning, copying, and printing options as traditional options available on many devices; however, the interface of the GUI 108 is modifiable according to the business application that has been chosen. Figure 5 is one example of how options may appear to the user. Alternatively, an interface may be displayed with options that are proprietary to a specific business application.

[0041] In Fig. 6 a second tab has been selected. The user is enabled to enter a fax number using the numeric keypad, and to select cover sheet options. If a database button 604 is selected instead, a keyboard 1000 of Fig. 10 may be displayed, whereby the user is enabled to enter all or a portion of a name. Upon pressing the OK button, a search is conducted in, for example, the database 112, and a list of possible matching names and fax numbers is displayed (as well as e-mail addresses if available) as shown in Figure 7. The user may scroll through the list until a desired fax number is found, which may then be selected by pressing the associated fax button 702.

[0042] Referring now to Fig. 8, shown therein is a schematic block diagram illustrating one embodiment of a GUI 108 displaying e-mail options. The user may enter an e-mail address by touching the Enter Email Address button 802, which brings up a virtual keyboard 1000 of Figure 10. If the e-mail address is not known, then the database button 804 may be selected. Again, the keyboard 1000 appears, but instead of entering the complete email, the user may enter any part of an e-mail address, name or the like, and after pressing the ok button 1002, the

search is then made in the database 112. Figure 7 is then shown, and a list of possible matching names and e-mail addresses is displayed.

[0043] Figure 9 is a schematic block diagram illustrating one embodiment of a library user interface displayed on the GUI 108. The user may select the library tab 902, and in response, the multifunction controller 102 accesses a database 112 containing forms and displays the current forms index. The user may scroll through the displayed forms index until a desired form is located, which can then be selected by touching the form name. The Copy/Print tab button 502 can then be touched to print or copy the form desired. Alternatively, the form may be faxed or e-mailed to a desired recipient or recipients, as described above.

[0044] The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

[0045] What is claimed is:

1. A standalone multifunction device comprising:
 - a modifiable user interface module configured to adapt to a plurality of business application interfaces;
 - an input device incorporating a graphical user interface;
 - a source interface module configured to receive input data from at least one document data source; and
 - a target interface module configured to output processed document data.
2. The standalone multifunction device of claim 1, further comprising a scriptable script engine module configured to control the operation of the standalone multifunction device and interface with a business application.
3. The standalone multifunction device of claim 1, further comprising a plurality of application integration modules configured to interface with the script engine module and provide input and output fields to the user interface module.
4. The standalone multifunction device of claim 3, wherein each of the application integration modules are further configured to interface with a specified business application.
5. The standalone multifunction device of claim 1, further comprising a user input module configured to allow a user to customize the input device.
6. The standalone multifunction device of claim 1, further comprising a scanning device configured to transmit document data to the source interface.

7. The standalone multifunction device of claim 1, further comprising a printing device configured to receive document data from the target interface.

8. The standalone multifunction device of claim 1, further comprising a communications module configured to transmit and receive data over a plurality of data communication channels.

9. The standalone multifunction device of claim 8, wherein the communications module is configured to output processed document data as a facsimile.

10. The standalone multifunction device of claim 8, wherein the communications module is configured to output processed document data as an e-mail.

11. The standalone multifunction device of claim 8, wherein the communications module is configured to output processed document data to an external device.

12. The standalone multifunction device of claim 1, wherein the input device is a touch screen apparatus.

13. A system comprising:
- a data communications network;
 - a standalone multifunction device connected to the data communications network;
 - a modifiable user interface module configured to adapt to multiple business application interfaces;
 - an scriptable script engine module configured to control the operation of the multifunction device, including interfacing with business applications;
 - an input device incorporating a graphical user interface;
 - a plurality of application integration modules, configured to interface with the script engine module and provide a user interface for applications; and
 - a user input module configured to allow a user to customize the input device.

14. The system of claim 13, further comprising a facsimile apparatus configured to receive document data from the multifunction device and transmit the document data as a facsimile.

15. A computer network system comprising:
- a server connected to a network;
 - a standalone multifunction device connected to the network;
 - an interface module within the multifunction device, the interface module configured to communicate with a plurality of multifunction devices over the network;
 - a facsimile module within the multifunction device, the facsimile module configured to send facsimiles; and
 - an e-mail module within the multifunction device, the e-mail module configured to send e-mails.

16. The computer network system of claim 15, wherein the facsimile module comprises a facsimile apparatus configured to communicate with the server over a data communications network.

17. The computer network system of claim 15, wherein the e-mail module comprises an e-mail server configured to communicate with the server over a data communications network.

18. A method for multifunction device document management, the method comprising:
- interfacing with a business application interface;
 - receiving user information;
 - inputting document data; and
 - submitting document data to the business application.

19. A computer readable storage medium comprising computer readable code configured to carry out a process for multifunction business document management, the process comprising:

interfacing with a business application interface;
receiving user information;
inputting document data; and
submitting document data to the business application.

20. An apparatus for multifunction business document management, the apparatus comprising:

means for interfacing with a business application interface;
means for receiving user information;
means for inputting document data; and
means for submitting document data to the business application.

METHOD SYSTEM AND APPARATUS FOR SCRIPTABLE MULTIFUNCTION DEVICE CONTROLLER

ABSTRACT OF THE DISCLOSURE

Disclosed are an apparatus, system, and method for application integration and scriptability. The apparatus may comprise a multifunction device configured with a user interface module that is modifiable, and an engine module that is scriptable. The scriptable engine module may be configured to adapt to multiple applications and subsequently provide an appropriate user interface with accompanying input and output data fields. In one embodiment, the apparatus may be configured with self-contained application interfaces. The application interfaces may be configured to receive document data from a scanner, or alternatively, the application interface may be configured to output document data as an e-mail or fax. The system may include a network, the multifunction device and a plurality of optional services such as printers, e-mail servers, libraries, and databases. The method may include providing the application interfaces, identifying a user, accessing an application, receiving document data from the user, and submitting the document data to the chosen application.

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100 →

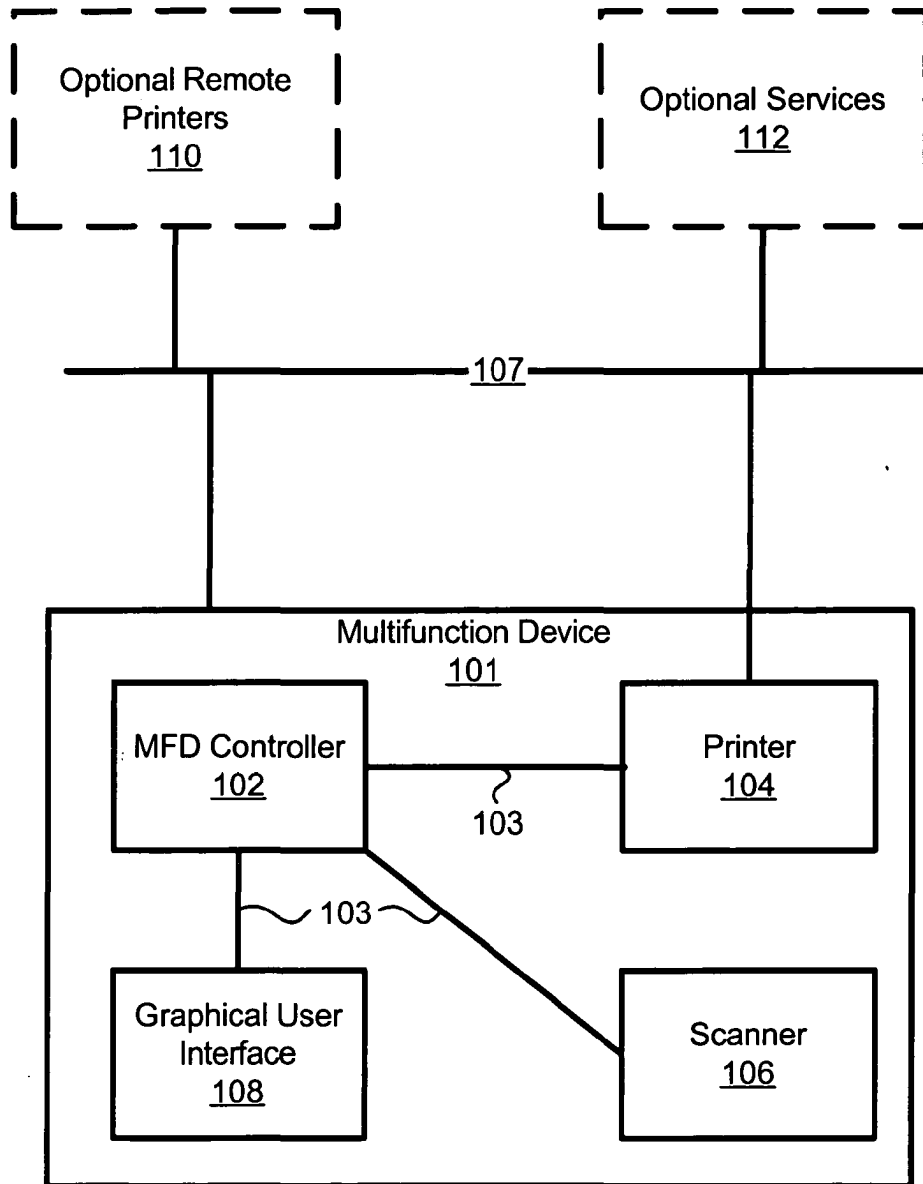
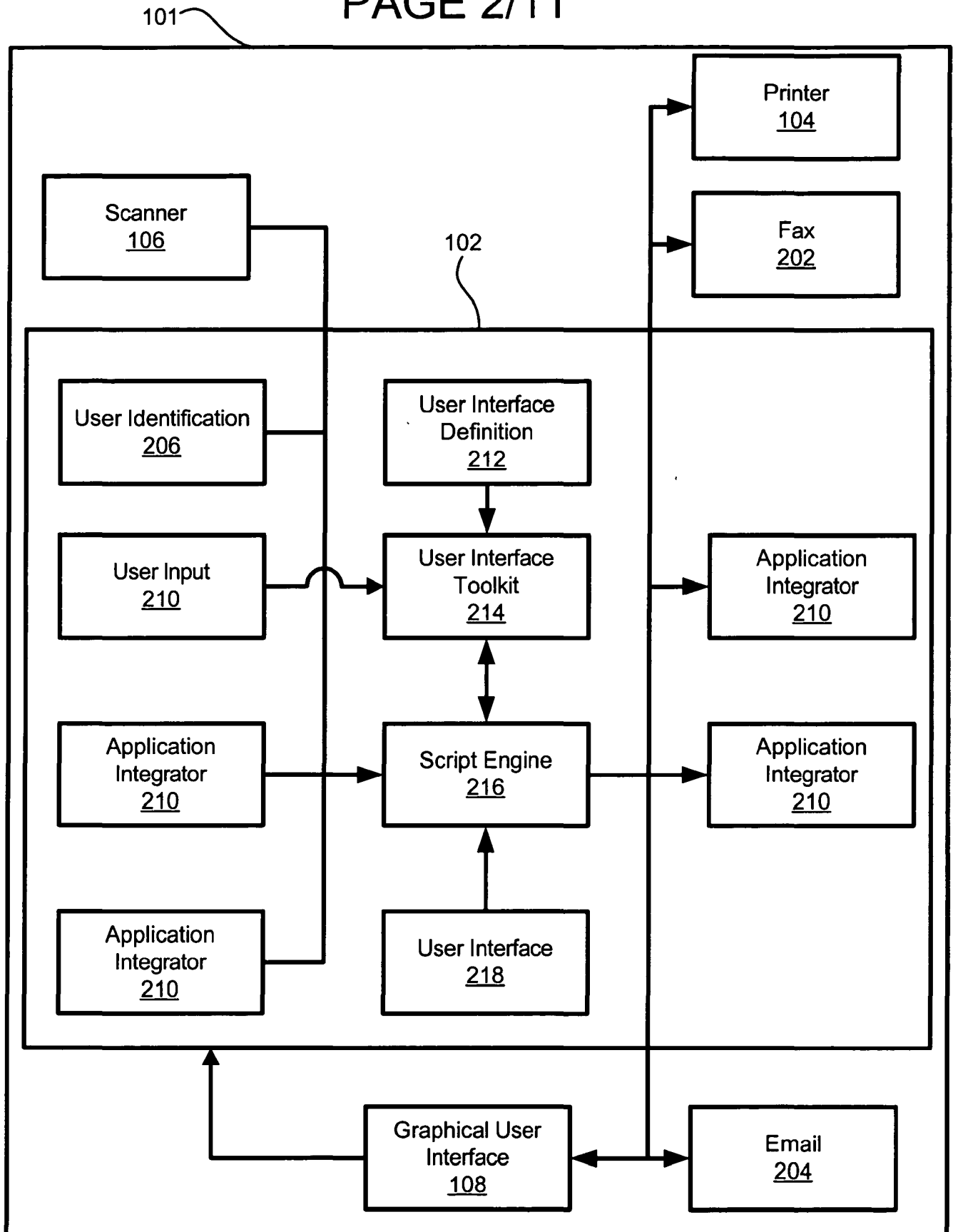
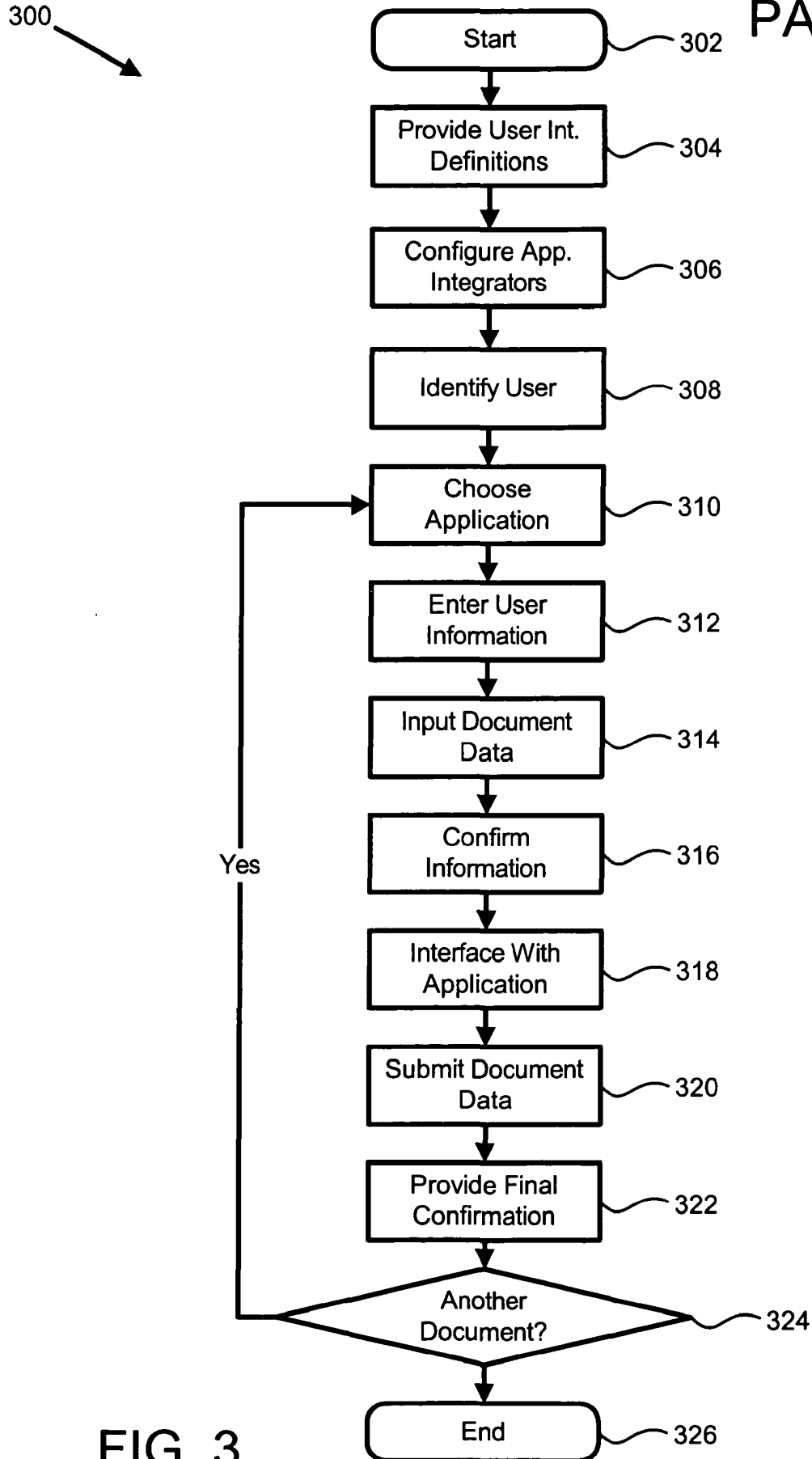


FIG. 1

PAGE 2/11





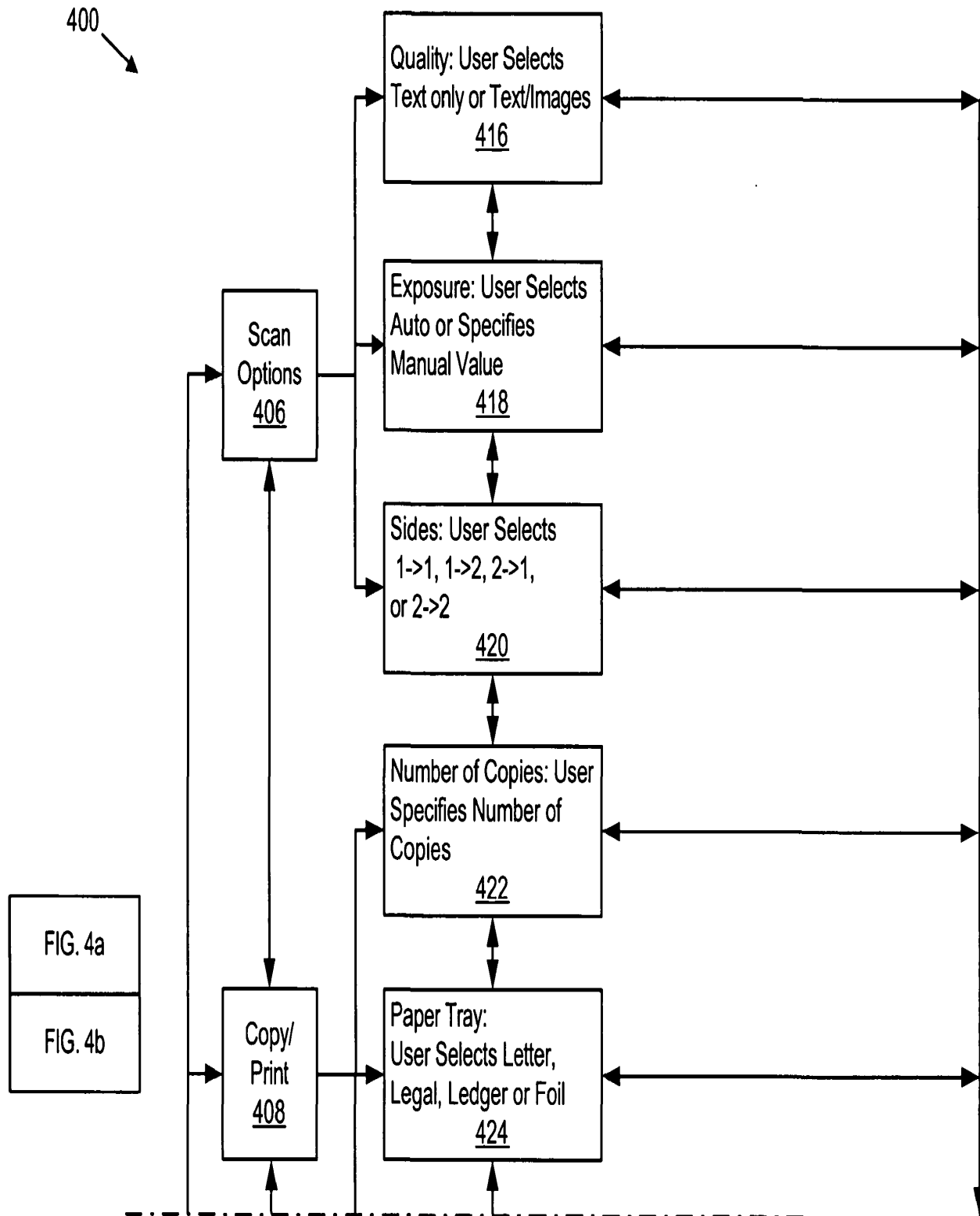


FIG. 4a

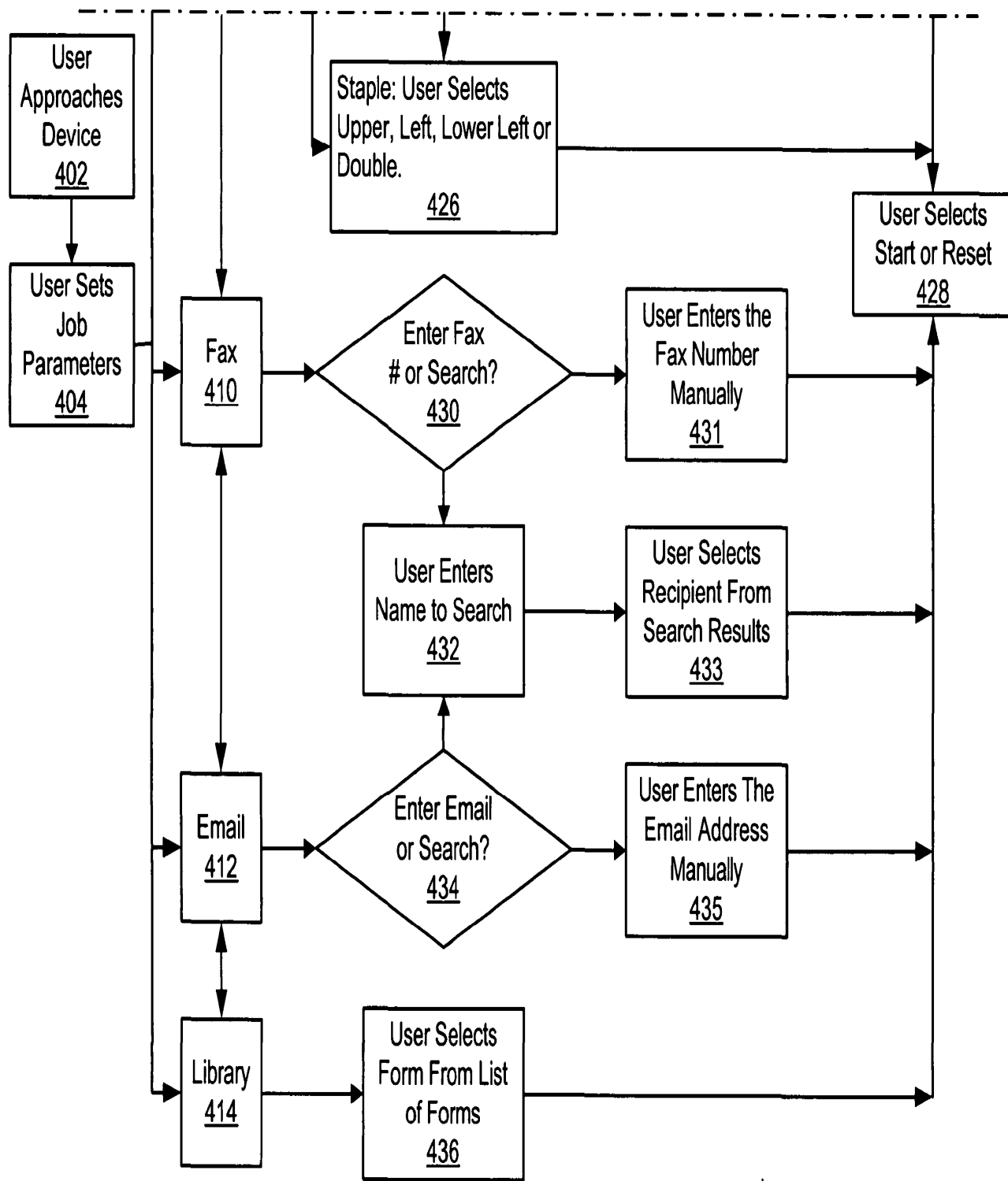


FIG. 4b

PAGE 6/11

108 ↗

502

Copy/Print Fax Email Library

Scan Options:

Quality
 Text Only Text/Images

Exposure
 Auto Lighten Darken

Sides
 1 → 1 1 → 2 2 → 1 2 → 2

Copy/Print

Tray
 Letter Legal Ledger Foil

Staple
 None Upper Left Double Staple

Printer
 B&W

Copies
 1 2 3 4 5 6 7 8 9 0 C ←

Start

Reset

You have selected to:
 ▶ Copy/Print
 Send a fax
 Send an Email
 Print a Form

Please swipe badge

FIG. 5

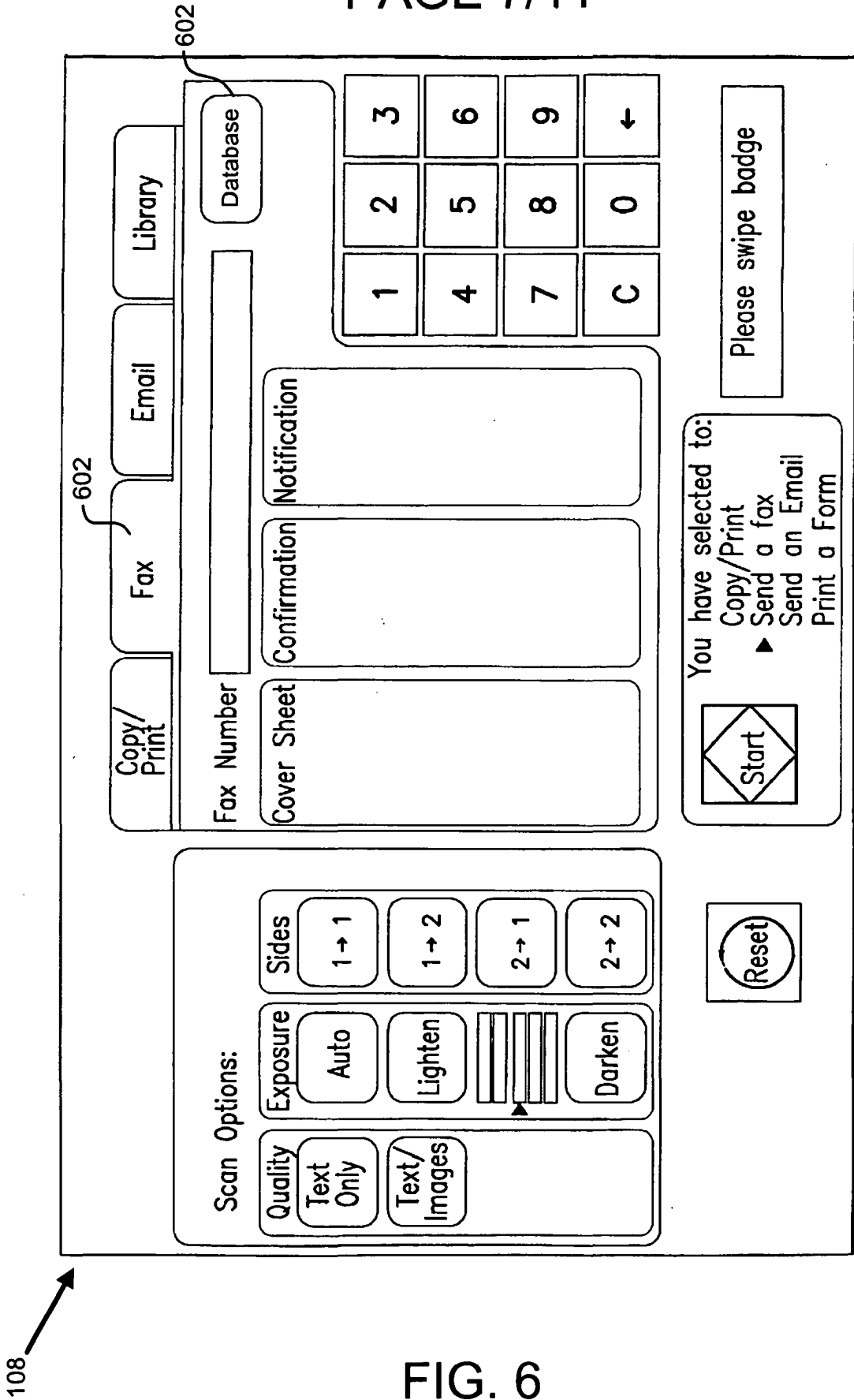


FIG. 6

108 →

es

3

6

9

↓

Search Results:

Select recipient from list

6 People Found

Name	Email Address	Fax Number
		Fax ~ 702
		Fax ~ 702
		Fax ~ 702
		Fax
		Fax
		Fax

New Search

Cancel

☒

Send an Email

☐

Print a Form

S

Qu

T

Q

T

Im

FIG. 7

108

Copy/Print Fax Email Library

Scan Options:

Quality Exposure Sides

Text Only Auto 1 → 1

Text/Images Lighten 1 → 2

Darken 2 → 1

2 → 2

Email Address 802

Enter email Address

Email Note

Format

PDF Converts input into a document document optimized for viewing and printing

Text Converts input into a document that can be imported into a word processor for editing

BluePages 804

(Reset)

Start

You have selected to:

Copy/Print

Send a fax

Send an Email

Print a Form

Please swipe badge

FIG. 8

108 ↘

108 ↘

502

902

Copy/Print

Fax

Email

Library

Scan Options:

Quality

Text Only

Text/Images

Exposure

Auto

Lighten

Darken

Sides

1→1

1→2

2→1

2→2

Description

Adoption Assistance Claim Form

Applicant Evaluation Form

Cooperative Education/Internship Student Performance Evaluation

Dental Plan Claim Form for 2000

Dental Plan Claim Form for 1999

Dependent Care Expense Verification

Reset

Start

You have selected to:

Copy/Print

Send a fax

Send an Email

Print a Form

Please swipe badge

FIG. 9

1000 ↗

Enter name to search:

~ , Tab Caps Lock Shift

! 1

Q

A

Shift

@ 2

W

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X

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3

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Enter

→

↑ Shift

@

Space

←

→

OK

Cancel

Send an Email

Print a Form

FIG. 10



US005361134A

United States Patent [19]

Hu et al.

[11] **Patent Number:** **5,361,134**[45] **Date of Patent:** **Nov. 1, 1994**[54] **INTEGRATED MULTIFUNCTIONAL DOCUMENT PROCESSING SYSTEM FOR FAXING, COPYING, PRINTING, AND SCANNING DOCUMENT INFORMATION**[75] Inventors: **Darwin Hu**, San Jose, Calif.; **John J. Ring**, Cherry Hill, N.J.[73] Assignee: **Oki America, Inc.**, Hackensack, N.J.[21] Appl. No.: **72,364**[22] Filed: **Jun. 3, 1993****Related U.S. Application Data**

[63] Continuation of Ser. No. 857,215, Mar. 25, 1992, abandoned, Continuation-in-part of Ser. No. 746,831, Aug. 19, 1991, abandoned.

[51] Int. Cl.⁵ **H04N 1/21; G03G 21/00**[52] U.S. Cl. **358/296; 358/401; 358/442; 355/202**[58] Field of Search **358/296, 401, 442, 443, 358/444, 468; 355/202, 204; 400/121**[56] **References Cited****U.S. PATENT DOCUMENTS**

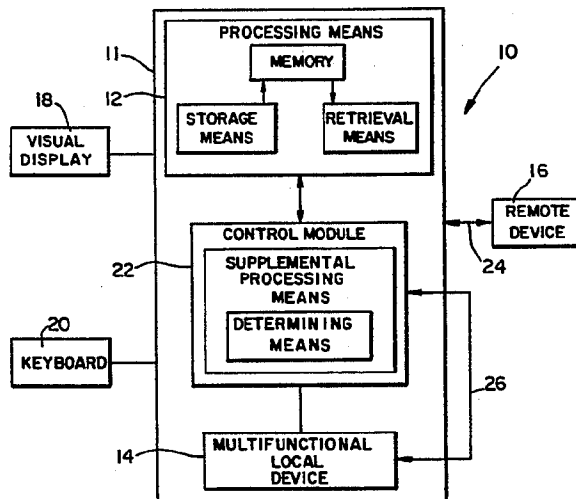
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Primary Examiner—Benjamin R. Fuller*Assistant Examiner*—Eric Frahm*Attorney, Agent, or Firm*—Panitch Schwarze Jacobs & Nadel[57] **ABSTRACT**

A multifunctional document processing system for faxing, copying, printing or scanning document information and for transmitting and receiving document signals to and from a remote device. The system comprises a multifunctional local device which includes a scanner for optically scanning document information, for converting the scanned document information into electrical document signals and for transmitting the document signals to the processor. The multifunctional local device also includes a recording device, such as a printer for receiving document signals from the processor and for producing a recorded form of the document information, such as a printed document based on the received document signals. A control module is interfaced between the processor and the multifunctional local device for receiving document signals from the multifunctional local device and from the remote device and for sending the received documents signals to the processor. The control module also receives document signals from the processor and sends the received document signals to either the multifunctional local device or the remote device. The control module additionally generates and transmits control signals to the multifunctional local device.

10 Claims, 5 Drawing Sheets

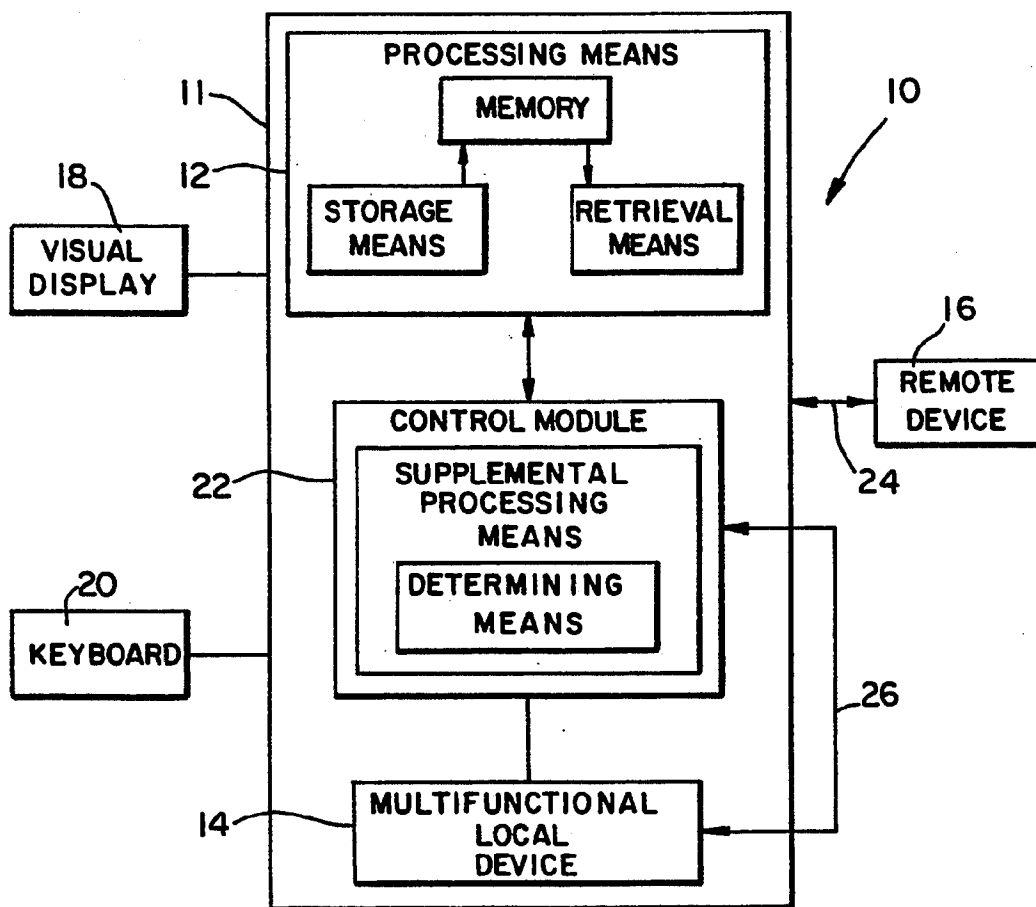


FIG. 1

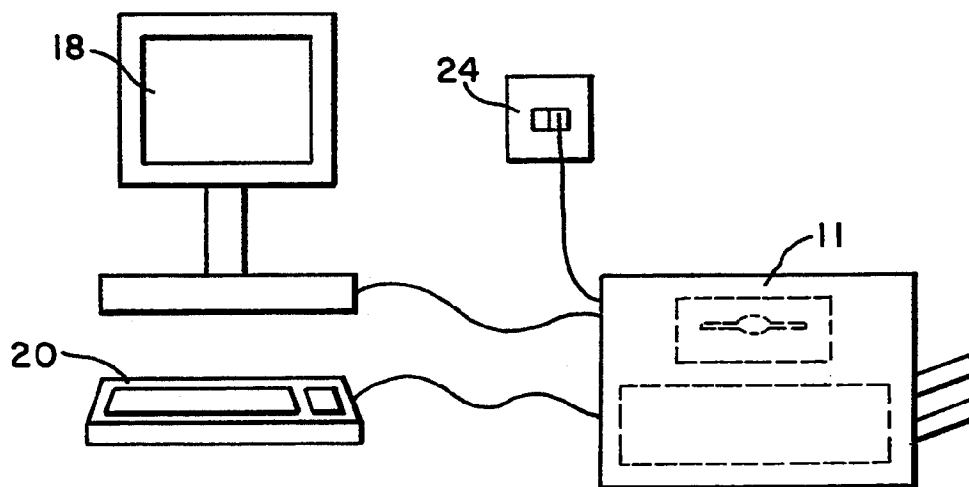
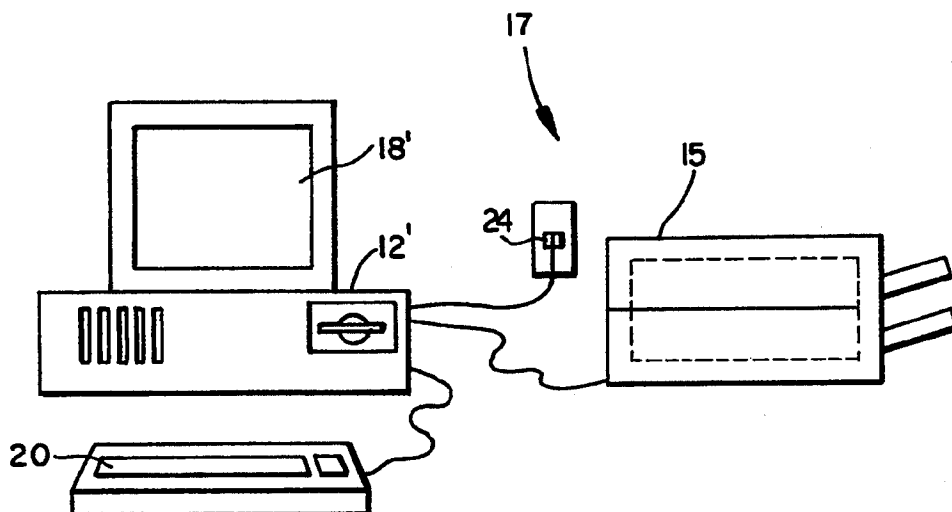
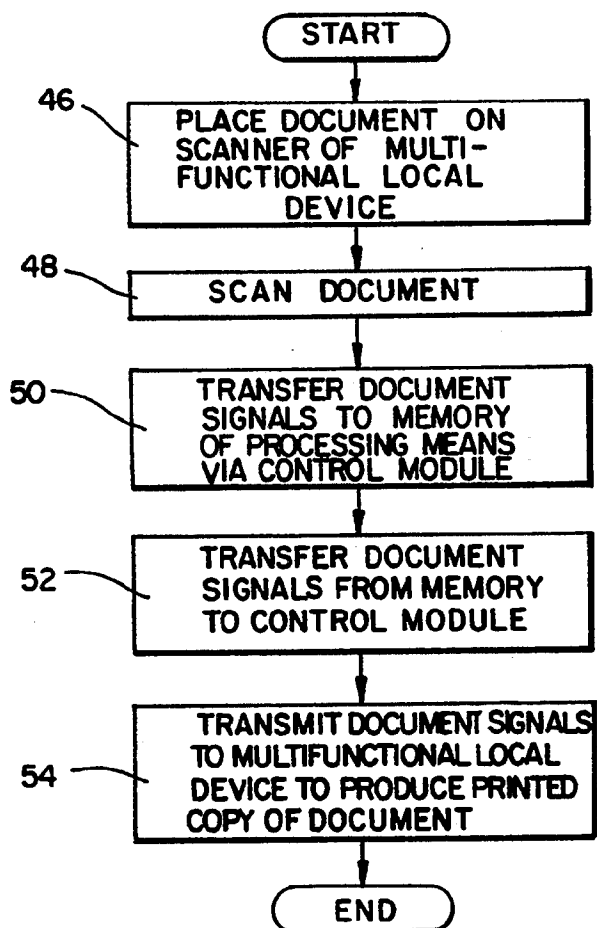
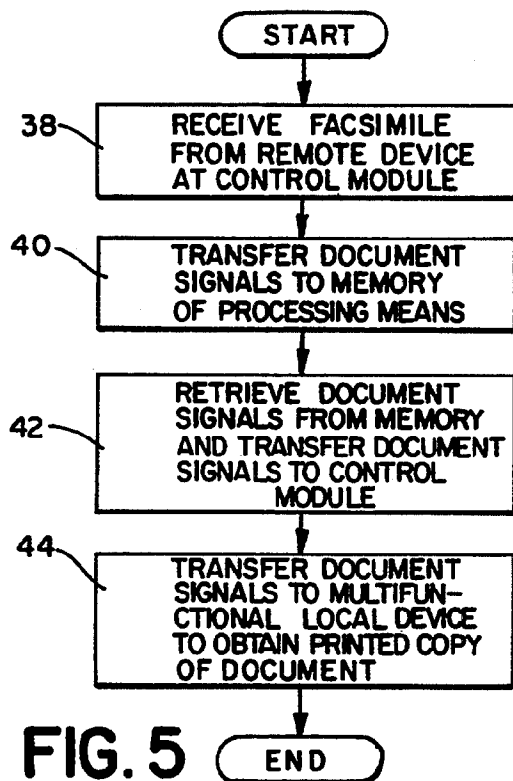
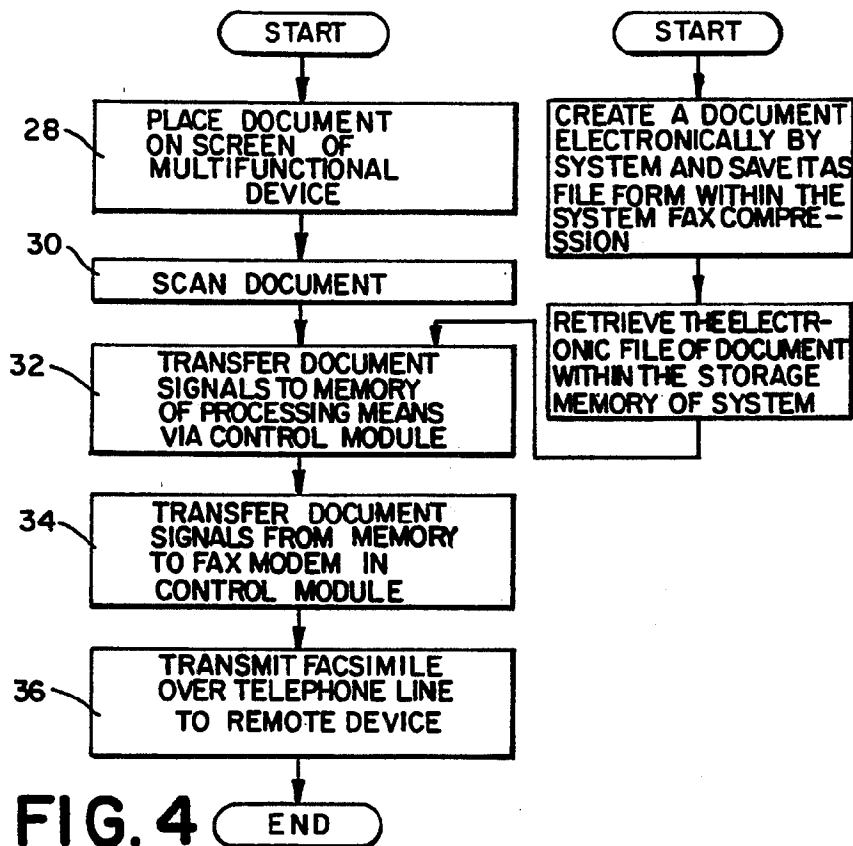


FIG. 2

**FIG. 3****FIG. 6**



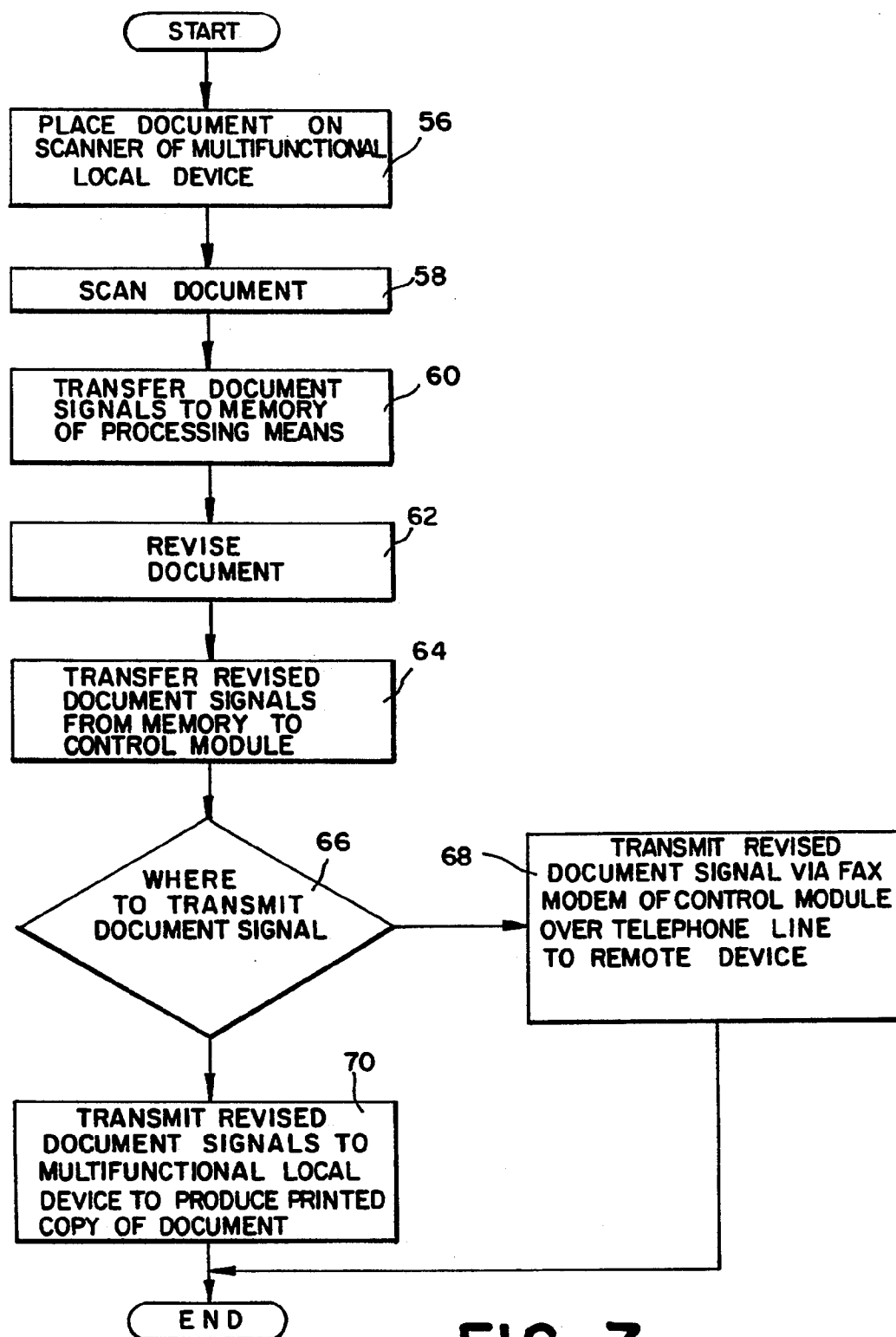
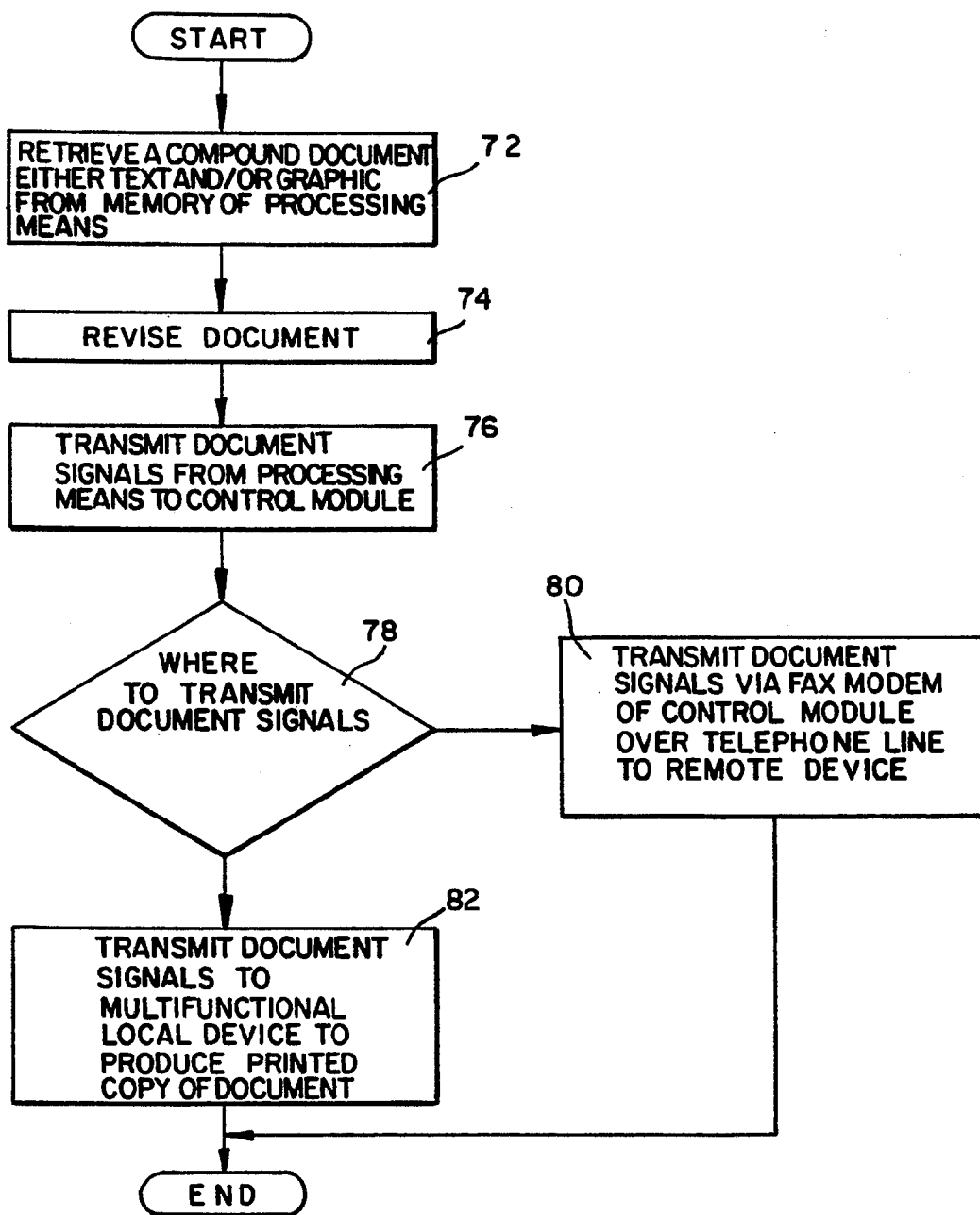


FIG. 7

**FIG. 8**

INTEGRATED MULTIFUNCTIONAL DOCUMENT PROCESSING SYSTEM FOR FAXING, COPYING, PRINTING, AND SCANNING DOCUMENT INFORMATION

This is a continuation of application Ser. No. 07/857,215, filed Mar. 25, 1992 abandoned, which is a continuation-in-part of co-pending application Ser. No. 07/746,831, filed Aug. 19, 1991 abandoned.

BACKGROUND OF THE INVENTION

The present invention relates to an integrated multifunctional document processing system and, more particularly, to a multifunctional document processing system which may be used for processing, scanning, faxing, printing and copying document information.

Most modern offices have separate machines for scanning documents, sending and receiving faxes, printing documents and copying documents. Each such separate machine is restricted to its own particular function and occupies a predetermined amount of office space. If a printed document is to be faxed to a remote location and additional copies of the document are to be made, a facsimile machine must be used to fax a copy of the document to the remote location and a separate copier must be used to make additional copies of the document. The use of two separate machines to accomplish relatively similar functions can be time consuming, particularly if each machine is located in a different part of the office. In addition, two machines can be expensive to acquire and maintain and often require twice as much office space as a single machine which could perform both functions.

In addition, many offices use word processors or personal computers (hereinafter collectively referred to as a personal computer) to create and edit documents. A separate printer, such as a laser printer, LED printer, etc., is usually associated with the personal computer so that printed copies of documents may be obtained from the personal computer. A copy of each of the documents is normally stored within a hard disk or other long term storage device of the personal computer or on a separate floppy disk so that the document can be retrieved at a later point in time if additional copies of the document are needed or to permit editing of the document. If the document is to be edited or revised, the document is retrieved from the memory of the personal computer and the changes are made. A printed copy of the revised version of the document can then be obtained by entering the appropriate instructions into the personal computer for activating the printer to print a copy of the document.

Most other office machines, such as fax machines, copiers and optical scanners are incapable of independently creating or revising a document. Such machines are only capable of accepting documents which are in final form and, in the case of a fax machine, normally must be printed on a type of paper suitable for faxing. For example, if a revised form of a document is to be faxed to a remote location and, prior to faxing, the document must be retrieved from the memory of the personal computer, revised, and reprinted by the printer onto paper before it is ready to be supplied to the fax machine to be faxed. This multi-step, multi-machine operation can be a time consuming process which can ultimately lower the efficiency of an office.

There is a strong need for a single apparatus or device which is capable of creating and editing document information and which also inherently includes the capability of scanning, faxing, printing and copying a document. There is also a need for a system which can ensure confidentiality of documents such that access to the documents is limited to an identified person or a group of identified persons. The apparatus or device should preferably be compact so that the device can be maintained on a desk top and the device must be capable of producing high quality printed copies acceptable for business purposes.

The present invention is directed to an integrated multifunctional document processing system (MDPS) which is capable of scanning, faxing, copying or printing a document. Document information is converted into electrical document signals and is transmitted by a remote device to the MDPS. Alternatively, document information is directly inputted into the MDPS and converted into electrical documents signals. Processing means within the MDPS processes the document signals and transmits the document signals to the remote device or outputs the document signals directly via a multifunctional local paper processing device. The local paper processing device or remote device then performs the desired function, i.e., either scanning, faxing, printing or copying the requested document. The local paper processing device is contained with the MDPS and directly interfaced with the processing means. The remote device is external to the MDPS and interfaced with the processing means of the MDPS. Control means communicates to and from the local paper processing device or remote device and the processing means.

The MDPS of the present invention is user friendly and can be employed for accomplishing a variety of tasks. For example, if a user wanted to prepare a resume and incorporate a photograph, the text portion of the resume can be prepared utilizing the word processing features of the processing means and the photograph can be scanned into the MDPS utilizing a scanner associated with the MDPS. The processing means can then integrate the photograph with the text and the resulting resume can be printed by the local paper processing device of the MDPS. In addition, a previously printed document which is not stored in the MDPS can be updated or changed by scanning the document directly into the processing means using the scanner. The changes can then be made to the paper utilizing the word processing features of the processing means and the revised document can be printed out by the local paper processing device of the MDPS.

The system also permits a single document stored within the memory of the processing means to be sequentially faxed to multiple fax machines at multiple remote locations utilizing fax software within the processing means. Incoming faxes which are received by the system are stored in the memory of the processing means for later printout. The system provides for identified fax documents to be stored in specifically identified memory locations (i.e., mailboxes) within the processing means for later retrieval and/or printout only by a particular person to whom the fax is addressed under the control of a particular security code or password. The system also permits the addressee of a fax to retrieve the fax from a remote location utilizing another fax machine or another multifunctional document processing system. It is clear that the system of the present

invention is more versatile and is able to perform additional tasks or functions which could not be readily performed utilizing a separate printer, scanner and/or fax machine as is done with the prior art.

SUMMARY OF THE INVENTION

Briefly stated, the present invention is directed to an integrated multifunctional document processing system for faxing, copying, printing or scanning document information and for transmitting and receiving document signals to and from a remote device. The document processing system comprises a housing which includes scanning means for optically scanning document information, document information converting means for converting the scanned document information into electrical document signals; and processing means for processing the electrical document signals. A multifunctional local device is located within the housing and includes recording means for receiving document signals from the processing means and for producing a recorded form of the document information based on the received document signals. Control means located between the processing means and the multifunctional local device receives the document signals from the multifunctional local device. The control means also receives document signals from the remote device over a communication medium. The control means sends the received document signals to the processing means. The control means also receives document signals from the processing means and sends the received document signals to either the multifunctional local device or the remote device over the communication medium. The control means further functions to generate and transmit control signals to the multifunctional local device.

BRIEF DESCRIPTION OF THE DRAWING

The foregoing summary, as well as the following detailed description of a preferred embodiment, will be better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, there is shown in the drawings an embodiment which is presently preferred, it being understood, however, that the invention is not limited to the specific methods and instrumentalities disclosed. In the drawings:

FIG. 1 is a schematic block diagram of a preferred embodiment of an integrated document processing system in accordance with the present invention;

FIG. 2 is an elevational view of the integrated document processing system of FIG. 1;

FIG. 3 is an alternate embodiment of the document processing system of FIG. 1;

FIG. 4 is a flow chart depicting the facsimile transmission function of the document processing system of FIG. 1;

FIG. 5 is a flow chart depicting the facsimile reception function of the document processing system of FIG. 1;

FIG. 6 is a flow chart depicting the copying function of the document processing system of FIG. 1;

FIG. 7 is a flow chart depicting the scanning and editing functions of the document processing system of FIG. 1; and

FIG. 8 is a flow chart depicting the editing and printing functions of the document processing system of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings wherein like numerals indicate like elements throughout, there is shown in FIGS. 1 and 2, an embodiment of an integrated multifunctional document processing system (MDPS) 10 in accordance with the present invention. The MDPS 10 comprises a housing 11 which forms a single stand alone unit containing the necessary logic and circuitry for scanning, printing, copying or faxing a document. The MDPS 10 comprises processing means 12 which receives document signals from a multifunctional local paper processing device or multifunctional local device 14, preferably located within the MDPS housing 11 or a remote device 16, for processing of the document signals within the multifunctional local device 14 or transmitting the document signals to the remote device 16. The processing means 12 which is illustrated in FIG. 2 is preferably a personal computer, such as, but not limited to, an IBM or an IBM compatible computer, or any other type of processor which is adapted to be integrated into the housing 11 of the MDPS 10. It is to be understood by those skilled in the art that any other brand or type of computer system, word processing system, whether networked or stand alone, or any other type of related device could be used in conjunction with the MDPS 10 without departing from the spirit and scope of the present invention. The terms processing means, personal computer and host computer are used herein only for the sake of brevity and should not be considered a limitation on the present invention.

The processing means 12 as illustrated includes a hard disk (not shown) as well as a main memory (not shown) which together act as the main storage data facility or memory of the processing means 12 in the usual manner well-known in the art.

Document signals received from the multifunctional local device 14 and the remote device 16 are stored within the memory of the processing means 12 until the signals are retrieved and processed. Auxiliary storage devices, such as floppy discs or the like can also be used to store the document signals received from the multifunctional local device 14 or the remote device 16 for later processing of the document signals.

The processing means 12 is preferably connected to a visual display device 18, such as a CRT, for displaying a document on-line. A user of the MDPS 10 can retrieve document signals from the memory of the processing means 12 and can display the document on the visual display device 18 for editing or otherwise changing the document. In addition, a keyboard 20 is associated with the processing means 12 for creating and revising documents which can be stored within the memory. The keyboard 20 may also be used for inputting instruction commands to the multifunctional local device 14. It is to be understood by those skilled in the art that any form of editing or creating device can be also used in conjunction with the processing means 12, such as, but not limited to, a touch screen, a laser pen, a mouse or the like.

The processing means 12 is interfaced with a control means, which is preferably a control module 22 located within the housing 11 of the MDPS 10, which passes document signals between the processing means 12 and the multifunctional local device 14 or the remote device 16. The control module 22 is preferably a self-contained plug-in printed circuit board or card which can be con-

veniently inserted within an available port (not shown) within the processing means 12. The control module 22 is an intelligent controller which controls all communication, printer emulation, printer, scanner and fax functions within the MDPS 10. The control module 22 can further include a supplementary processor (not shown) which is preferably a 32 bit processor, such as an Intel 80960 processor. The supplementary processor can also be a 16-bit or a 64-bit processor. The supplementary processor receives document signals from the processing means 12 or from the multifunctional local device 14 and determines the function which is to be performed with respect to the received document signals, i.e., print, fax, etc., and the destination of the document signals, i.e., to the multifunctional local device 14, to the remote device 16 or to the processing means 12. The functions which can be performed with respect to the document signals are scanning a document, faxing a document to a remote location, receiving a document faxed from a remote location, copying a document, and printing a document.

The control module 22 further includes a facsimile modem (not shown) for transmitting or receiving facsimiles to or from a remote location via the remote device 16 which in the present embodiment is a remotely located fax machine. The facsimile modem operates in the usual well-known manner to transmit documents over a communicating medium 24, such as the public switched telephone network and comprises 16 8-bit control registers. If the document signals received by the control module supplementary processor are to be faxed to the remote device 16 or have been received from the remote device 16, the supplementary processor accesses the facsimile modem for proper transmission or reception of the document signals. The supplementary processor accesses the control registers of the facsimile modem through an 8-bit parallel port (not shown). The parallel port transfers transmitting document signals and receiving document signals in an 8-bit data format.

As discussed above, the control module 22 controls all print, scan and fax functions. When the control module 22 receives document signals from the processing means 12, the control module 22 first identifies what function is to be performed and at what destination. In the preferred embodiment, the document signals received by the control module 22 are coded so that the control module 22 can easily identify the function which is to be performed. The code is preferably one that is easily recognized by the control module supplementary processor. For example, if the control module 22 is to transmit document signals to the remote device 16, such as through a facsimile transmission, the document signals received from the processing means 12 are transferred within the control module 22 to the facsimile modem (not shown) which converts the document signals into the appropriate format and then transmits the document signals over a communication medium 24 to the remote device 16. In the preferred embodiment, the communication medium 24 is a telephone link. It is to be understood by those skilled in the art that any suitable communication medium or transmission device can be used such as, but not limited to a modem or a UART. The remote device 16 can be a conventional facsimile or a multifunctional machine, such as, but not limited to a combination copier and facsimile, a combination facsimile and personal computer, or a device

capable of scanning, faxing, copying or printing a document.

When a local function is to be performed such as printing or copying a document, the document signals are transmitted from the processing means 12 to the control module 22, which transfers the document signals to the multifunctional local device 14 contained within the housing of the MDPS 10. The multifunctional local device 14 in the preferred embodiment is employed for processing paper and preferably includes scanning means, such as a standard optical scanner for optically scanning document information and converting the scanned document information into electrical document signals. The multifunctional local device 14 also includes a recording or printing means, such as a standard printer for receiving document signals from the processing means 12 and for producing a recorded form of the document information, for example, a printed document based on the received document signals. In the presently preferred embodiment, the optical scanner is a removable hand held scanner and the printer is a standard LED printer, such as an OL800 printer which is commercially available from Okidata, Inc. It should be recognized that any other type of scanner and/or recording device, such as a film recorder, screen or other such device could alternatively be employed.

An interface 26 is located between the control module 22 and the multifunctional local device 14 for transmitting information in the form of electrical document signals and control signals between the control module 22 and the multifunctional local device 14, such as instructions for performing a particular function or status information. In the preferred embodiment, the interface 26 is a high speed serial video interface but some other appropriate interface, such as a small computer system interface (SCSI) could be employed.

Three types of document signals are communicated over the interface 26 from the control module 22 to the multifunctional local device 14. The first type of signals transmitted to the multifunctional local device 14 instruct the multifunctional local device 14 to print a particular document based upon particular document signals received from the processing means 12. The second type of signals transmitted to the multifunctional local device 14 instructs the multifunctional local device 14 to scan a particular document utilizing the scanner and to transmit the document signals from the scanner to the processing means 12. The third type of document signals transmitted to the multifunctional local device 14 act as a command or response communication to the multifunctional local device 14 and include printer, scanner and data flow control signals. All commands and responses are transferred between the multifunctional local device 14 and the control module 22 along the same physical connection via the interface 26.

Referring specifically to FIG. 3, there is shown an alternate embodiment of a document processing system 17 in accordance with the present invention. In the alternate embodiment, the processing means 12' is preferably an independent or stand alone personal computer which is attached to a separate stand alone multifunctional local peripheral device 15 by a control module (not shown) located within the personal computer. The control module is also connected to a remote device by a communication medium 24 which is preferably a standard telephone line. The document processing system 17 operates in a manner similar to that of the MDPS 10

and therefore, the detail of its operation will not be described further.

Referring to FIGS. 4-8, there are shown functional flow diagrams depicting a preferred manner for performing the various document processing functions in accordance with the above-described embodiment of the document processing system 10. Referring specifically to FIG. 4, there is shown a flow diagram depicting the preferred method by which the MDPS 10 functions to send or transmit a fax of a previously printed document to a remote location, such as to the remote device 16. The faxing function begins by placing a previously printed document to be faxed on the scanner (not shown) of the multifunctional local device 14 as depicted in block 28 or by passing the scanner over the document. The document is scanned and the information from the document is converted by the scanner and associated components into electrical document signals in block 30. In the preferred embodiment, the electrical document signals are initially digitized by the scanner and then converted into electrical signals. The document signals are then transferred to the memory of the processing means 12 utilizing the control module 22 as illustrated in block 32. The processing means 12 determines when the document signals are to be processed and may also maintain a stored copy of the document signals in the memory until a user of the MDPS 10 chooses to delete the document signals. The document signals are also transferred from the memory of the processing means 12 back to the control module 22 as illustrated in block 34. The control module 22 first determines that a facsimile transmission is to be performed and the document signals are transferred to the facsimile modem which is located within the control module 22. The document signals are then transmitted by the control module facsimile modem to the remote device 16 over the communication medium 24 as depicted in block 36. A printed copy of the facsimile transmission is produced at the remote device 16 in the manner well-known in the art depending upon the type of remote device 16 being employed.

Referring specifically to FIG. 5, there is shown a flow diagram depicting the preferred method by which a facsimile is received by the MDPS 10. A facsimile transmitted from the remote device 16 is transmitted as document signals over the communication medium 24 to the control module 22 as shown in block 38. The control module 22 determines whether the received document signals are to be transmitted to the processing means 12 or the multifunctional local device 14. Once the control module 22 detects that the document signals are an incoming facsimile received from the remote device 16, the received document signals are transferred to the memory of the processing means 12 as illustrated in block 40. If the multifunctional local device 14 is otherwise occupied when a printed copy of the facsimile is to be obtained, the received facsimile document signals can be stored in the memory of the processing means and retrieved by the user to be viewed on the visual display 18 associated with the processing means 12. A user can also request that a printed copy of the received facsimile be made if the multifunctional local device 14 is available. The received facsimile document signals are retrieved from the memory of the processing means 12 and are transferred to the control module 22 as shown in block 42. Once the control module 22 determines that the document signals are to be printed the control module 22 transfers the document signals to the

multifunctional local device 14 to obtain a printed copy of the document as shown in block 44. In the preferred embodiment, the received facsimile is printed on plain paper. An indicator (not shown) may be associated with the multifunctional local device 14 to indicate to a user that a facsimile has been received. The indicator could either be a visual indicator, such as an LED or other lighted indicator or an audible indicator, such as an audible alarm signal.

Referring specifically to FIG. 6, there is shown a flow diagram depicting a preferred method of performing the copying function of the MDPS 10. A previously printed document to be copied is first placed on the scanner of the multifunctional local device 14 or the scanner is passed over the document as illustrated in block 46. The document is scanned and the information from the document is converted by the scanner and associated components into electrical document signals as shown in block 48. The document signals from the scanner are transferred from the multifunctional local device 14 to the memory of the processing means 12 via the control module 22 as illustrated in block 50. The document signals are then processed and are transferred from the memory of the processing means 12 back to the control module 22 as illustrated in block 52. Once the control module 22 has determined that a copying function is to be performed, the document signals are transferred from the control module 22 to the multifunctional local device 14 to produce a printed copy of the document as shown in block 54. If multiple copies of the document are to be made or the copies are to be made on a particular sized paper, the document signals are coded to indicate the particular instructions to the multifunctional local device 14 to obtain the desired number or sized copies.

Referring specifically to FIG. 7, there is shown a flow diagram depicting the preferred method of performing the editing function of the MDPS 10. A previously printed document is placed on the scanner of the multifunctional local device 14 as shown in block 56. The document is scanned and the information from the document is converted by the scanner into electrical document signals as shown in block 58. The document signals are transferred from the multifunctional local device 14 to the memory of the processing means 12 via the control module 22 as illustrated in block 60. If the document is to be edited or revised, the document is retrieved from the memory of the processing means 12 and viewed on the visual display 18 associated with the processing means 12 for editing using the keyboard 20. Once the desired changes have been made to the document, using the keyboard 20, the edited document may be stored in the memory of the processing means 12 for later use. The document may also be faxed to a remote location or printed. The document signals are transferred to the control module 22 as shown in block 64. The control module 22 determines in block 66 whether the document signals are to be faxed to the remote device 16 or sent to the multifunctional local device for printing 14. If the document signals are to be faxed to the remote device 16, the control module 22 transfers the document signals to the facsimile modem which transmits the document signals over the communication medium 24 to the remote device 16 as shown in block 68. If the document signals are to be transferred to the multifunctional local device 14 for printing, the control module 22 transmits the document signals to the multi-

functional local device 14 to produce a printed copy of the document as shown in block 70.

Referring specifically to FIG. 8, there is shown a flow diagram depicting the preferred method of performing the printing function of the MDPS 10. A document to be printed is either created in the processing means 12 by using the keyboard 20 or is retrieved from the memory of the processing means 12 as shown in block 72. If revisions are to be made to the document, the document is revised in the processing means 12 as shown in block 74. The document signals are then transmitted from the processing means 12 to the control module 22 in block 76. The control module 22 determines what function is to be performed with the document signals as shown in block 78. If the selected function is to fax the document to the remote device 16, the document signals are transferred to the facsimile modem located in the control module 22 which transmits the document signals over the communication medium 24 to the remote device 16 as shown in block 80. If the document is to be printed the document signals are transferred from the control module 22 to the multifunctional local device 14 to produce a printed copy of the document as illustrated in block 82.

From the foregoing description, it can be seen that the present invention is directed to an integrated multifunctional document processing system 10 which is capable of scanning, faxing, copying and printing a document and for transmitting and receiving document signals to and from a remote device. It will be recognized by those skilled in the art that changes may be made to the above-described embodiment of the invention without departing from the broad inventive concepts thereof. It is understood, therefore, that this invention is not limited to the particular embodiments disclosed, but is intended to cover all modifications which are within the scope and spirit of the invention as defined by the appended claims.

We claim:

1. An integrated multifunctional document processing system for faxing, copying, printing or scanning document information and for transmitting and receiving document signals to and from a remote device, the multifunctional document processing system comprising:

a housing;

main processing means located within the housing for processing all electrical document signals;

a multifunctional local device physically separate from but electrically connected to said main processing means, said multifunctional device located within the housing, said multifunctional local device including scanning means for optically scanning document information and for converting the scanned document information into electrical document signals, transmitting means for transmitting document signals to the main processing means, receiving means for receiving document signals from the main processing means, and recording means for producing a recorded form of document information based on received document signals;

a control means located within the housing, interfaced between the main processing means and the multifunctional local device, and having supplemental processing means for processing electrical document signals, the control means, under the control of the supplemental processing means, for receiving all incoming document signals from the

multifunctional local device and from the remote device over a communication medium and for sending the received incoming document signal to the main processing means, the main processing means for processing the incoming document signals received from the control means and for processing and transmitting outgoing document signals, the control means also for receiving all outgoing processed document signals from the main processing means and sending received outgoing processed document signals to the multifunctional local device or the remote device over the communication medium, the control means functioning to require that all document signals from the local and remote devices be transmitted to the main processing means and that all processed document signals from the main processing means be transmitted to the local or remote devices, the control means further functioning, under the control of the supplemental processing means, to generate and transmit control signals to the multifunctional local device;

storing means for storing document signals received from said local device or said remote device in a memory within said main processing means;

determining means within the supplemental processing means for determining a destination for the stored document signals based on the received document signals; and

retrieving means for retrieving stored document signals from the memory and transmitting the retrieved document signals to a destination established by the determining means.

2. The system according to claim 1, wherein the recording means is a printer integrated within the multifunctional local device which produces printed documents.

3. The system according to claim 2, wherein the printer is an LED page printer.

4. The system according to claim 1, wherein the control means further includes memory means for storing document signals received from the multifunctional local device or the remote device and for storing document signals transmitted from the processing means.

5. The system according to claim 1, wherein the processing means can selectively substantively edit document signals received from the remote device or the multifunctional local device and transmit the edited document signals to the multifunctional local device or the remote device.

6. The system according to claim 1, wherein the control means supplements processing functions performed by the processing means.

7. The system according to claim 1, wherein the processing means further includes memory means for storing document signals received from the multifunctional local device and the remote device.

8. A method of utilizing a multifunctional document processing system for transmitting a facsimile of a document to a remote location, the multifunctional document processing system including scanning means for optically scanning document information and main processing means for processing all document information, the scanning means and main processing means located within a housing, the method comprising the steps of: placing a document to be faxed on the scanning means of the multifunctional document processing system;

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scanning the document;
 converting the scanned document into electrical document signals;
 transferring the document signals to the main processing means utilizing a control module having supplemental processing means for processing electrical document signals within the control module, the control module being located within the housing;
 determining in the supplemental processing means a destination for the document signals;
 transferring the document signals from the main processing means to the control module;
 identifying the destination of the document signals to be a facsimile modem;
 transferring the document signals to the facsimile modem destination associated with the control module;
 transmitting the document signals from the facsimile modem to a device at the remote location over a communication medium; and
 printing a copy of the transmitted facsimile at the remote location.

9. A method of utilizing a multifunctional document processing system for receiving a facsimile of a document to a remote location, the multifunctional document processing system including printing means for producing a printed document and main processing means for processing all document signals, the printing means and main processing means located within a housing, the method comprising the steps of:

receiving document signals from a device at the remote location over a communication medium at a control module having supplemental processing means for processing electrical document signals within the control module, the control module being located within the housing;
 transferring the document signals from the control module to the main processing means;
 determining in the supplemental processing means a destination for the document signals;

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identifying the destination of the document signals to be the multifunctional document processing system;
 retrieving the document signals from the main processing means and transferring the document signals to the control module;
 transferring the document signals from the control module to the multifunctional document processing system destination; and
 producing a printed copy of the document at the multifunctional document processing system.

10. A method of utilizing a multifunctional document processing systems for making a copy of a document, the multifunctional document processing system including scanning means for optically scanning document information, main processing means for processing all document information, and printing means for producing a printed document, the scanning means, processing means, and printing means located within a housing, the method comprising the steps of:

placing a document on the scanning means of the multifunctional document processing system;
 scanning the document;
 converting the scanned document into electrical document signals;
 transferring the document signals to the main processing means utilizing a control module having supplemental processing means for processing electrical document signals within the control module, the control module being located within the housing;
 determining in the supplemental processing means a destination for the document signals;
 transferring the document signals from the main processing means to the control module;
 identifying the destination of the document signals to be the printing means;
 transferring the document signals from the control module to the printing means of the multifunctional document processing system; and
 producing a printed copy of the document.

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UNITED STATES PATENT APPLICATION

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**METHOD SYSTEM AND APPARATUS FOR SCRIPTABLE
MULTIFUNCTION DEVICE CONTROLLER**

METHOD SYSTEM AND APPARATUS FOR SCRIPTABLE MULTIFUNCTION DEVICE CONTROLLER

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] This invention relates to multifunction devices such as, but not limited to, devices that integrate facsimile, scanner, copier, and printer function, and more particularly relates to multifunction devices with self-contained scriptability and application integration.

DESCRIPTION OF THE RELATED ART

[0002] In order to minimize equipment costs, multifunction devices have begun to replace traditional office printers, copiers, scanners, and fax machines. Currently, multifunction devices may have a direct cable or network connection to a server or desktop computer. Using software residing on the computer or server, the multifunction device is adaptable to many applications. For example, a multifunction device may be used for processing many business related documents such as payroll, contracts, expense accounts, and human resource applications, to name a few. Businesses have invested large amounts of time and resources into systems designed to streamline the examples given. However, the effectiveness of such a centralized business application processing system is reduced when paper is involved.

[0003] Previously, for example, a user wanting reimbursement for a business expense would approach a multifunction device, scan in the receipt, send that scanned document to his or her computer, and then submit that scanned document to an expense administrator to be processed. Additionally, many users may share one multifunction device and therefore a user may be required to walk to the other side of the building, scan a document, and return to his or her desk and hope that the document was properly sent. This type of solution is not cost effective. Alternative solutions require a separate server for processing the expense

information. For example, the server may be required to identify the user and what the user is trying to accomplish.

[0004] Additionally, conventional multifunction devices are generally based upon proprietary device controllers and small touch screen user interfaces. The device controllers are hardwired into the multifunction device and offer little, if any, flexibility or upgradeability for new or improved business applications. The small touch screen user interface creates difficulty when a user desires to send a scanned or copied document to a remote location via fax or email because the touch screen buttons are small and few in number.

[0005] What is needed is a process, apparatus, and system for a multifunction device that is modifiable to multiple business applications and has self-contained application integration. Such a process, apparatus, and system would be even more beneficial if provided with a scriptable, integrated user interface.

BRIEF SUMMARY OF THE INVENTION

[0006] The present invention has been developed in response to the present state of the art, and in particular, in response to the problems and needs in the art that have not yet been fully solved by currently available multifunction devices. Accordingly, the present invention has been developed to provide a process, apparatus, and system that overcome many or all of the above-discussed shortcomings in the art.

[0007] The apparatus of the present invention is a standalone multifunction device comprising a user interface module that is modifiable and configured to adapt to a plurality of business application interfaces. A controller module is scriptable and configured to control the operation of the multifunction device and interface with business applications. An input device incorporating a graphical user interface is provided as well as a source interface module configured to receive input data from at least one document data source and a target interface module configured to output processed document data.

[0008] In one embodiment, the multifunction device may also comprise a plurality of application integration modules configured to interface with the scriptable multifunction device controller and provide input and output fields to the modifiable user interface module. Additionally, the application integration modules may be configured to interface with a specified business application. In one embodiment of the present invention, the multifunction device may also comprise a scanning device configured to transmit document data to the source interface. Furthermore, the multifunction device may comprise a printing device configured to receive document data from the target interface.

[0009] The multifunction device may also comprise a communications module configured to transmit and receive data over a plurality of data communication connections. In certain embodiments, the communications module may be configured to output processed document data as a facsimile or as an e-mail. Alternatively, the communications module may be configured to output processed document data to an external device such as a server or separate fax machine.

[0010] In one embodiment of the present invention, a networked system is provided. The network may comprise a server, a multifunction device, a multifunction device interface module configured to communicate with a plurality of multifunction devices over a data communications network, a facsimile module configured to send facsimiles, and an e-mail module configured to send e-mails. Additionally, the facsimile module may comprise a facsimile apparatus configured to communicate with the server over a data communications network. Also, the e-mail module may comprise an e-mail server configured to communicate with the server over a data communications network.

[0011] The present invention may also comprise a method for document management. In one embodiment, the method comprises providing a multifunction device with a scriptable user interface module, identifying a user, accessing a business application interface, receiving user information, inputting document data, confirming information, interfacing with a business application, submitting document data to the business application, and providing a final confirmation to the user. Identifying a user may comprise using an identification card or requiring that the user enter a username and password. In one embodiment, the method further comprises previewing the data to be submitted before interfacing with the chosen business application.

[0012] The invention may also comprise a computer readable storage medium comprising computer readable code configured to carry out a process for business document management. In one embodiment, the process may comprise identifying a user, choosing a business application interface, entering user information, inputting document data, interfacing with business application, submitting document data to the business application, and providing final success or failure confirmation to the user.

[0013] These features and advantages of the present invention will become more fully apparent from the following description and appended claims, or may be learned by the practice of the invention as set forth hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] In order that the advantages of the invention will be readily understood, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments that are illustrated in the appended drawings. Understanding that these drawings depict only typical embodiments of the invention and are not therefore to be considered to be limiting of its scope, the invention will be described and explained with additional specificity and detail through the use of the accompanying drawings, in which:

[0015] Figure 1 is a schematic block diagram illustrating one embodiment of a multifunction device system in accordance with the present invention;

[0016] Figure 2 is a schematic block diagram illustrating one embodiment of a multifunction device controller module in accordance with the present invention;

[0017] Figure 3 is a schematic flow chart diagram illustrating one embodiment of a method of operation of the multifunction device in accordance with the present invention;

[0018] Figures 4a and 4b are schematic flow chart diagrams illustrating one embodiment of a method of use of the multifunction device in accordance with the present invention; and

[0019] Figures 5-10 are schematic block diagrams illustrating examples of screens displayed to a user of the multifunction device in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0020] Many of the functional units described in this specification have been labeled as modules, in order to more particularly emphasize their implementation independence. For example, a module may be implemented as a hardware circuit comprising custom VLSI circuits or gate arrays, off-the-shelf semiconductors such as logic chips, transistors, or other discrete components. A module may also be implemented in programmable hardware devices such as field programmable gate arrays, programmable array logic, programmable logic devices or the like.

[0021] Modules may also be implemented in software for execution by various types of processors. An identified module of executable code may, for instance, comprise one or more physical or logical blocks of computer instructions which may, for instance, be organized as an object, procedure, or function. Nevertheless, the executables of an identified module need not be physically located together, but may comprise disparate instructions stored in different locations which, when joined logically together, comprise the module and achieve the stated purpose for the module.

[0022] Indeed, a module of executable code could be a single instruction, or many instructions, and may even be distributed over several different code segments, among different programs, and across several memory devices. Similarly, operational data may be identified and illustrated herein within modules, and may be embodied in any suitable form and organized within any suitable type of data structure. The operational data may be collected as a single data set, or may be distributed over different locations including over different storage devices, and may exist, at least partially, merely as electronic signals on a system or network.

[0023] Referring now to Figure 1, shown therein is a schematic block diagram illustrating one embodiment of a system 100 incorporating a standalone multifunction device (MFD) 101 of the present invention. As defined herein, a standalone multifunction device 101 refers to a multifunction device configured for interfacing with a user and an application

without the need of a computer for processing document information. In one embodiment, the standalone multifunction device 101 comprises a MFD controller 102, a plurality of data communication channels 103, a printer 104, and an input device incorporating a graphical user interface (GUI) 108. Additionally, the standalone multifunction device 101 may be connected to a computer network 107. The MFD controller 102 is configured to communicate with the scanner 106 and the graphical user interface 108 over any suitable communication channels 103, such as a local area network, serial or parallel interface, or the like. In one embodiment of the present invention, the communication channel 103 may comprise a SCSI interface, which is well documented and known to those skilled in the art.

[0024] The printer 104 may be coupled separately to the global communications network 107 so that it may be accessed from other document sources, such as additional multifunction devices 101. The MFD controller 102 is also preferably coupled to the computer network 107 and is configured to utilize scanning, printing, copying, and sending capabilities of other multifunction devices 101. The computer network 107 may be a global communications network such as the Internet or a local area network, wide area network, or the like. Additionally, optional services 110, 112 may be available on the computer network 107. The optional services may include, but are not limited to, remote printers 110, e-mail, facsimile, directory, security, and library services and data storage services.

[0025] The scanner 106 and printer 104 may be any commercially available devices using industry standard interfaces to the MFD controller 102. In one embodiment, this provides an advantage in that the MFD controller 102 may be easily integrated with scanning and printing devices already in place.

[0026] The graphical user interface 108 may be configured as a touch screen LCD (not shown), or alternatively the graphical user interface 108 may be configured with common human interface devices such as a light pen, a keyboard and/or a mouse (not shown). The graphical user interface 108 may be configured to communicate with the MFD controller 102 over the data communication channel 103. Additionally, the graphical user

interface 108 may be configured to communicate user commands to the MFD controller 102.

Such commands might include, but are not limited to, user identification, scanning, faxing, emailing, copying, and submitting business related documents.

[0027] Figure 2 is a schematic block diagram illustrating one embodiment of the standalone multifunction device 101. Shown therein are the MFD controller 102, the printer 104, the scanner 106, and the graphical user interface 108 of Figure 1. Optional external modules include a fax module 202 and an email module 204. In the depicted embodiment, the fax module 202 and the email module 204 may be internal, application-based services configured to communicate with the MFD controller 102. Alternatively, the fax module 202 and the email module 204 may comprise remote fax and email devices configured to communicate with the MFD controller 102 over a data communication network (not shown), such as the data communication channels 103 of Figure 1.

[0028] In one embodiment of the present invention, the MFD controller 102 comprises a user identification module 206, a user input module 208, a plurality of application integrator modules 210, a user interface (UI) definition module 212, a UI toolkit 214, a script engine module 216, and a UI module 218. The user identification module 206 may be configured as an externally coupled identification card reader configured to receive an identification card from a user and compare the user information to a local database (not shown) or remote database 112. Alternatively, the user identification module 206 may comprise, but is not limited to, a retinal scanner, fingerprint biometric system, or badge scanner. In one embodiment, the user identification module 206 may be configured to communicate with the script engine module 216 and cause a login screen to appear on the graphical user interface 108.

[0029] In a further embodiment, the user input module 208 may be configured to receive user commands from the graphical user interface 108. In one embodiment, the user input module 208 is further configured to communicate the user commands with the user interface toolkit 214.

[0030] One advantage of the present invention is the modifiability of the application integrator modules 210. A user may configure an application integrator 210 to operate as both document data input and output. For example, one application integrator module 210 may be configured as an integrated business expense application, with the ability to communicate with the script engine module 216 and thereby display an appropriate user interface on the graphical user interface 108. Different embodiments of such user interfaces will be explained with greater detail below with reference to Figures 5-10.

[0031] Additionally, the application integrator modules 210 may be configured to receive processed document data from the script engine module 216 and output the processed document data. In one embodiment, an application integrator module 210 may emulate a fax machine and send processed document data to a remote fax server (not shown). Alternatively, the application integrator module 210 may be configured as a communications module to send messages or e-mails over a data communications network such as the global communications network 107 of Figure 1.

[0032] In one embodiment, the plurality of application integrators 210 is configurable as upgradeable applications operating within the standalone multifunction device 101. For example, the user may develop proprietary business application interfaces and load these interfaces onto the standalone multifunction device 101 through a management port (not shown). Alternatively, the interfaces may be loaded over data communication channels 103. In a further embodiment, the user may download and install a plurality of application integrators 210 from a global communications network.

[0033] One advantage of the present invention is the ability to modify the standalone multifunction device 101 to interface with a specific application. The user may configure the standalone multifunction device 101 by modifying the user interface definition module 212 and the user interface module 218. In one embodiment, the user interface definition module 212 and the user interface module 218 may be configured to receive user defined scripts or programs in order to modify the standalone multifunction device 101. For example, the user

definition module 212 may be configured to store a plurality of data objects. These data objects may be proprietary and business application specific. Additionally, the user interface module 218 may be configured to receive, store, and execute programs created in Java, C++, or the like.

[0034] In a further embodiment, the user interface toolkit 214 is configured to communicate with the user interface definition module 212 and the user input module 210 in order to communicate user commands into the script engine module 216. Additionally, the user interface module 218 may be configured with user commands, programs, scripts, or the like, in order to modify the functionality of the standalone multifunction device 101.

[0035] Referring now to Figure 3, shown therein is a schematic flow chart diagram illustrating one embodiment of a method 300 for controlling the standalone multifunction device 101. The method 300 starts 302 and user definitions are received 304. In one embodiment, the standalone multifunction device 101 is configured to receive user definitions through, but is not limited to, a management port (not shown) or over the data communications network 107. Once the definitions are received 304, the multifunction device may then be configured 306 with the plurality of application integrator modules 210. For example, application integrator modules 210 may be configured 306 as integrated programs designed for payroll, contracting, expense accounting, human resource managing, document presenting, document submitting, etc.

[0036] The standalone multifunction device 101 may now identify 308 a user. In one embodiment, the user is identified 304 as described previously with reference to module 206 of Figure 2. An application is chosen 310, and the standalone multifunction device 101 receives 312 user information. The user information may comprise job, account, or personal data. The standalone multifunction device 101 then receives 314 document data. Document data may be received 314 from the scanner 106 or from remote devices. In one embodiment, a remote device may comprise other multifunction devices 101. After receiving 314 the document data, the multifunction device confirms 316 the action the user desires to effect.

The standalone multifunction device 101 may then interface 318 with the chosen application and then submit 320 the document data. Final confirmation is provided 322 by the standalone multifunction device 101, and the user may choose to input 324 another document, or alternatively terminate 326 the session.

[0037] Figures 4a and 4b together illustrate one method 400 of user control of the standalone multifunction device 101. First, a user approaches 402 the standalone multifunction device 101, and the user sets 404 the parameters for a particular job. In one embodiment, setting the parameters 404 comprises selecting and setting parameters for one or a plurality of job types. The job types or options that can be selected using the GUI 108 include, but are not limited to, scanning 406, copy/printing 408, faxing 410, e-mailing 412, and accessing a library 414. Additionally, a user may select more than one option while performing a single job. For example, the user may scan 406 a document, as well as print 408, fax 410 and then e-mail 412 the scanned document. Alternatively, the user could select the archive 414 to access a particular form, and subsequently print 408 the selected form.

[0038] When selecting scanning 406 or copying/printing 408, the user may further define a number of job parameters, or, alternatively the user may simply use default parameters. The user-settable job parameters include, but are not limited to quality 416, e.g. text or image/text, exposure 418, number of sides 420, number of copies 422, paper tray 424, e.g., letter/legal, and staple options 426. While not specifically indicated in Figures 4a and 4b, the various scan options can preferably be set at any time, such as when setting copy, fax, e-mail and archive options. A user may select 416-426 none, one, some or all of the options while performing a particular job. After making a selection, the user then starts 428 the job, or resets 428 the job at which point the method 400 starts again at block 402.

[0039] If the user selects the fax 410, the GUI 108 displays appropriate selection fields where the user may enter 431 a fax number. Alternatively, the user may search 432 a directory database 112 for the fax number, and select 433 a recipient from the search results. The user may then start or cancel 428 the job. Alternatively, if the user selects e-mail 412, the GUI 108

displays appropriate selection fields wherein the user may choose 434 to enter 435 an e-mail address or search 432 as described above. The user may then start or cancel 428 the job. Finally, if the user selects the library 414, the user may select 436 a form from the list of forms maintained by the database 112. The user may then print 408, fax 410, or email 412 the selected form.

[0040] Figures 5-10 are schematic block diagrams showing multiple embodiments of the GUI 108 of the standalone multifunction device 101. In Fig. 5, the copy/print tab 502 is shown as selected. A user accustomed to the art will recognize the scanning, copying, and printing options as traditional options available on many devices; however, the interface of the GUI 108 is modifiable according to the business application that has been chosen. Figure 5 is one example of how options may appear to the user. Alternatively, an interface may be displayed with options that are proprietary to a specific business application.

[0041] In Fig. 6 a second tab has been selected. The user is enabled to enter a fax number using the numeric keypad, and to select cover sheet options. If a database button 604 is selected instead, a keyboard 1000 of Fig. 10 may be displayed, whereby the user is enabled to enter all or a portion of a name. Upon pressing the OK button, a search is conducted in, for example, the database 112, and a list of possible matching names and fax numbers is displayed (as well as e-mail addresses if available) as shown in Figure 7. The user may scroll through the list until a desired fax number is found, which may then be selected by pressing the associated fax button 702.

[0042] Referring now to Fig. 8, shown therein is a schematic block diagram illustrating one embodiment of a GUI 108 displaying e-mail options. The user may enter an e-mail address by touching the Enter Email Address button 802, which brings up a virtual keyboard 1000 of Figure 10. If the e-mail address is not known, then the database button 804 may be selected. Again, the keyboard 1000 appears, but instead of entering the complete email, the user may enter any part of an e-mail address, name or the like, and after pressing the ok button 1002, the

search is then made in the database 112. Figure 7 is then shown, and a list of possible matching names and e-mail addresses is displayed.

[0043] Figure 9 is a schematic block diagram illustrating one embodiment of a library user interface displayed on the GUI 108. The user may select the library tab 902, and in response, the multifunction controller 102 accesses a database 112 containing forms and displays the current forms index. The user may scroll through the displayed forms index until a desired form is located, which can then be selected by touching the form name. The Copy/Print tab button 502 can then be touched to print or copy the form desired. Alternatively, the form may be faxed or e-mailed to a desired recipient or recipients, as described above.

[0044] The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

[0045] What is claimed is:

1. A standalone multifunction device comprising:
 - a modifiable user interface module configured to adapt to a plurality of business application interfaces;
 - an input device incorporating a graphical user interface;
 - a source interface module configured to receive input data from at least one document data source; and
 - a target interface module configured to output processed document data.
2. The standalone multifunction device of claim 1, further comprising a scriptable script engine module configured to control the operation of the standalone multifunction device and interface with a business application.
3. The standalone multifunction device of claim 1, further comprising a plurality of application integration modules configured to interface with the script engine module and provide input and output fields to the user interface module.
4. The standalone multifunction device of claim 3, wherein each of the application integration modules are further configured to interface with a specified business application.
5. The standalone multifunction device of claim 1, further comprising a user input module configured to allow a user to customize the input device.
6. The standalone multifunction device of claim 1, further comprising a scanning device configured to transmit document data to the source interface.

7. The standalone multifunction device of claim 1, further comprising a printing device configured to receive document data from the target interface.

8. The standalone multifunction device of claim 1, further comprising a communications module configured to transmit and receive data over a plurality of data communication channels.

9. The standalone multifunction device of claim 8, wherein the communications module is configured to output processed document data as a facsimile.

10. The standalone multifunction device of claim 8, wherein the communications module is configured to output processed document data as an e-mail.

11. The standalone multifunction device of claim 8, wherein the communications module is configured to output processed document data to an external device.

12. The standalone multifunction device of claim 1, wherein the input device is a touch screen apparatus.

13. A system comprising:
- a data communications network;
 - a standalone multifunction device connected to the data communications network;
 - a modifiable user interface module configured to adapt to multiple business application interfaces;
 - an scriptable script engine module configured to control the operation of the multifunction device, including interfacing with business applications;
 - an input device incorporating a graphical user interface;
 - a plurality of application integration modules, configured to interface with the script engine module and provide a user interface for applications; and
 - a user input module configured to allow a user to customize the input device.

14. The system of claim 13, further comprising a facsimile apparatus configured to receive document data from the multifunction device and transmit the document data as a facsimile.

15. A computer network system comprising:
- a server connected to a network;
 - a standalone multifunction device connected to the network;
 - an interface module within the multifunction device, the interface module configured to communicate with a plurality of multifunction devices over the network;
 - a facsimile module within the multifunction device, the facsimile module configured to send facsimiles; and
 - an e-mail module within the multifunction device, the e-mail module configured to send e-mails.

16. The computer network system of claim 15, wherein the facsimile module comprises a facsimile apparatus configured to communicate with the server over a data communications network.

17. The computer network system of claim 15, wherein the e-mail module comprises an e-mail server configured to communicate with the server over a data communications network.

18. A method for multifunction device document management, the method comprising:
- interfacing with a business application interface;
 - receiving user information;
 - inputting document data; and
 - submitting document data to the business application.

19. A computer readable storage medium comprising computer readable code configured to carry out a process for multifunction business document management, the process comprising:

interfacing with a business application interface;
receiving user information;
inputting document data; and
submitting document data to the business application.

20. An apparatus for multifunction business document management, the apparatus comprising:

means for interfacing with a business application interface;
means for receiving user information;
means for inputting document data; and
means for submitting document data to the business application.

METHOD SYSTEM AND APPARATUS FOR SCRIPTABLE MULTIFUNCTION DEVICE CONTROLLER

ABSTRACT OF THE DISCLOSURE

Disclosed are an apparatus, system, and method for application integration and scriptability. The apparatus may comprise a multifunction device configured with a user interface module that is modifiable, and an engine module that is scriptable. The scriptable engine module may be configured to adapt to multiple applications and subsequently provide an appropriate user interface with accompanying input and output data fields. In one embodiment, the apparatus may be configured with self-contained application interfaces. The application interfaces may be configured to receive document data from a scanner, or alternatively, the application interface may be configured to output document data as an e-mail or fax. The system may include a network, the multifunction device and a plurality of optional services such as printers, e-mail servers, libraries, and databases. The method may include providing the application interfaces, identifying a user, accessing an application, receiving document data from the user, and submitting the document data to the chosen application.

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100 →

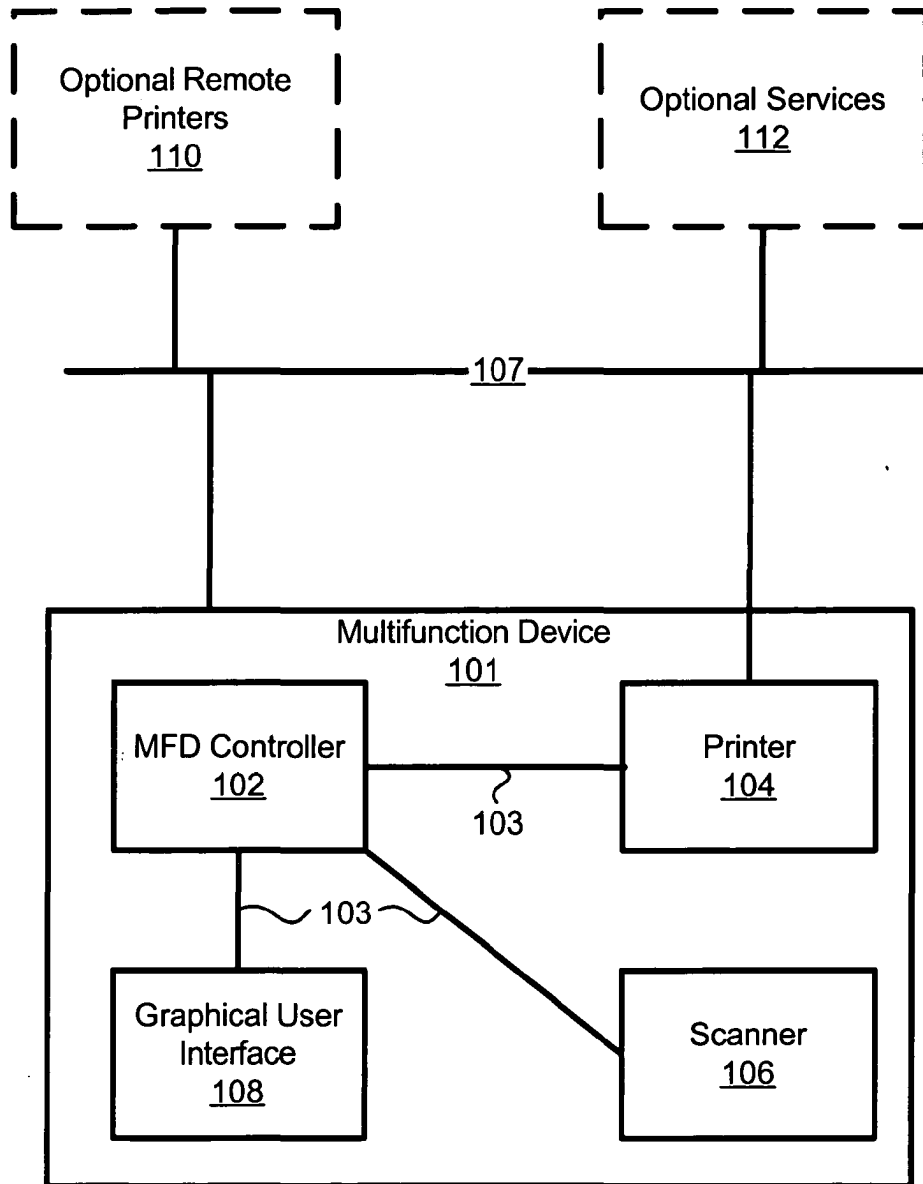
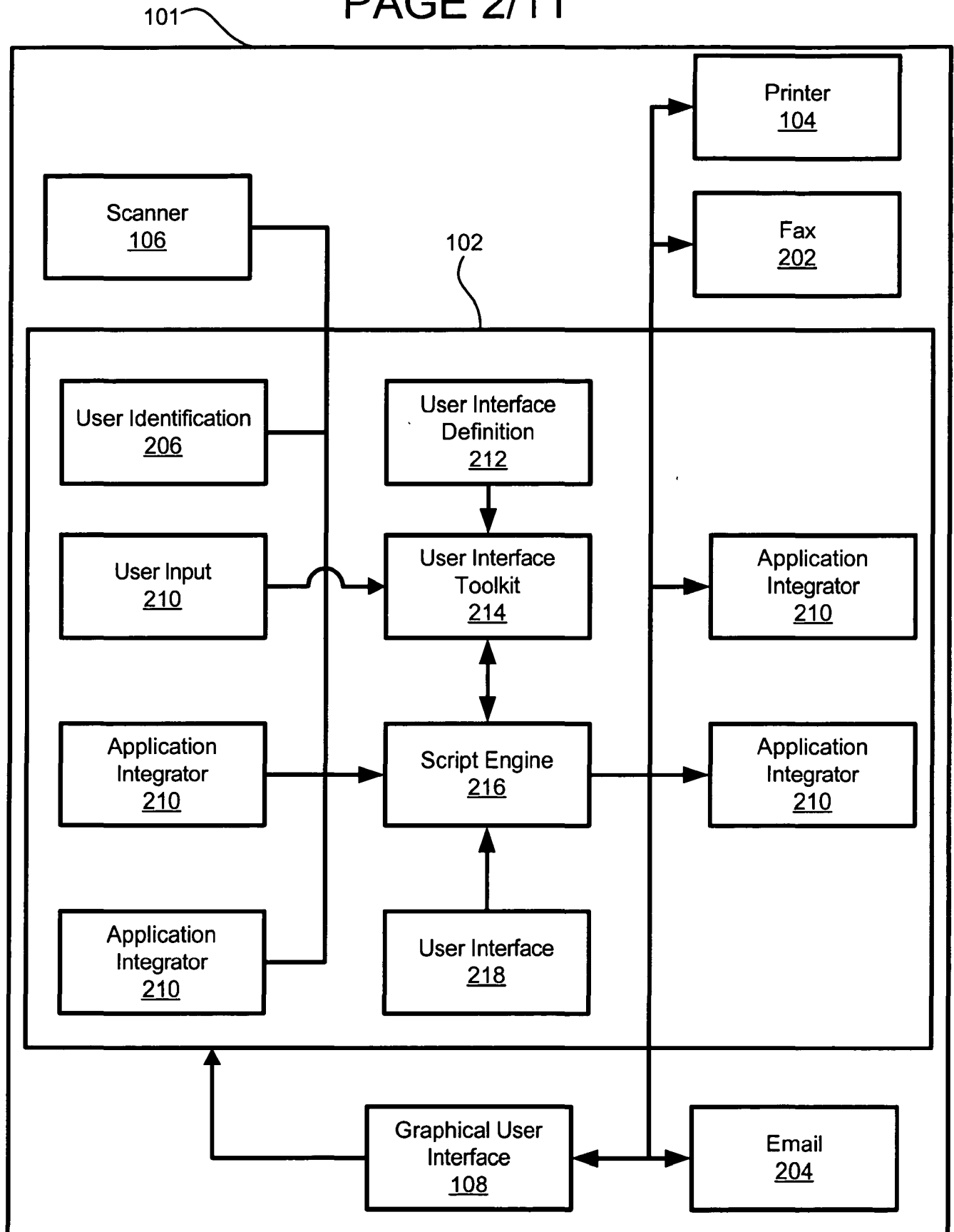
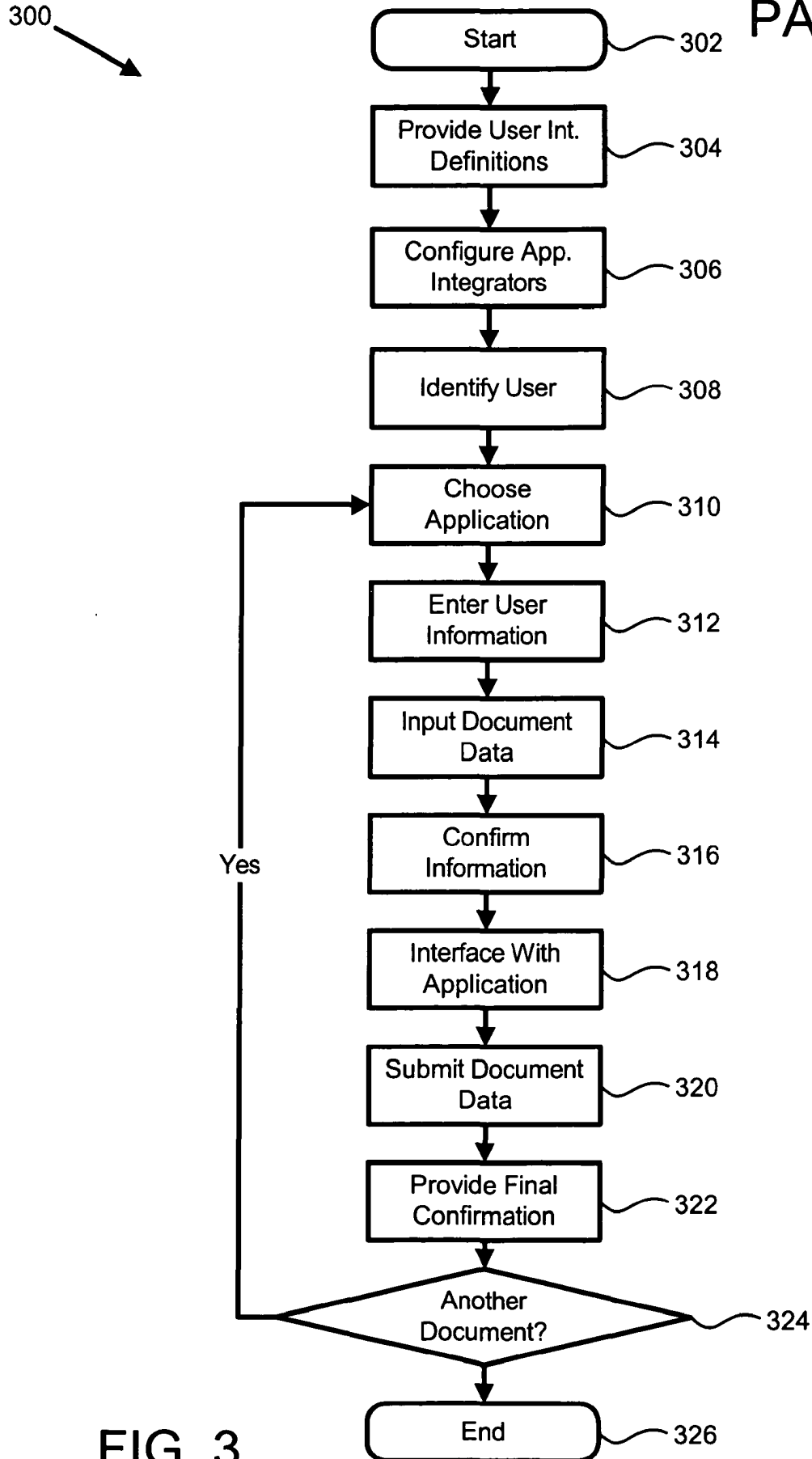


FIG. 1

PAGE 2/11





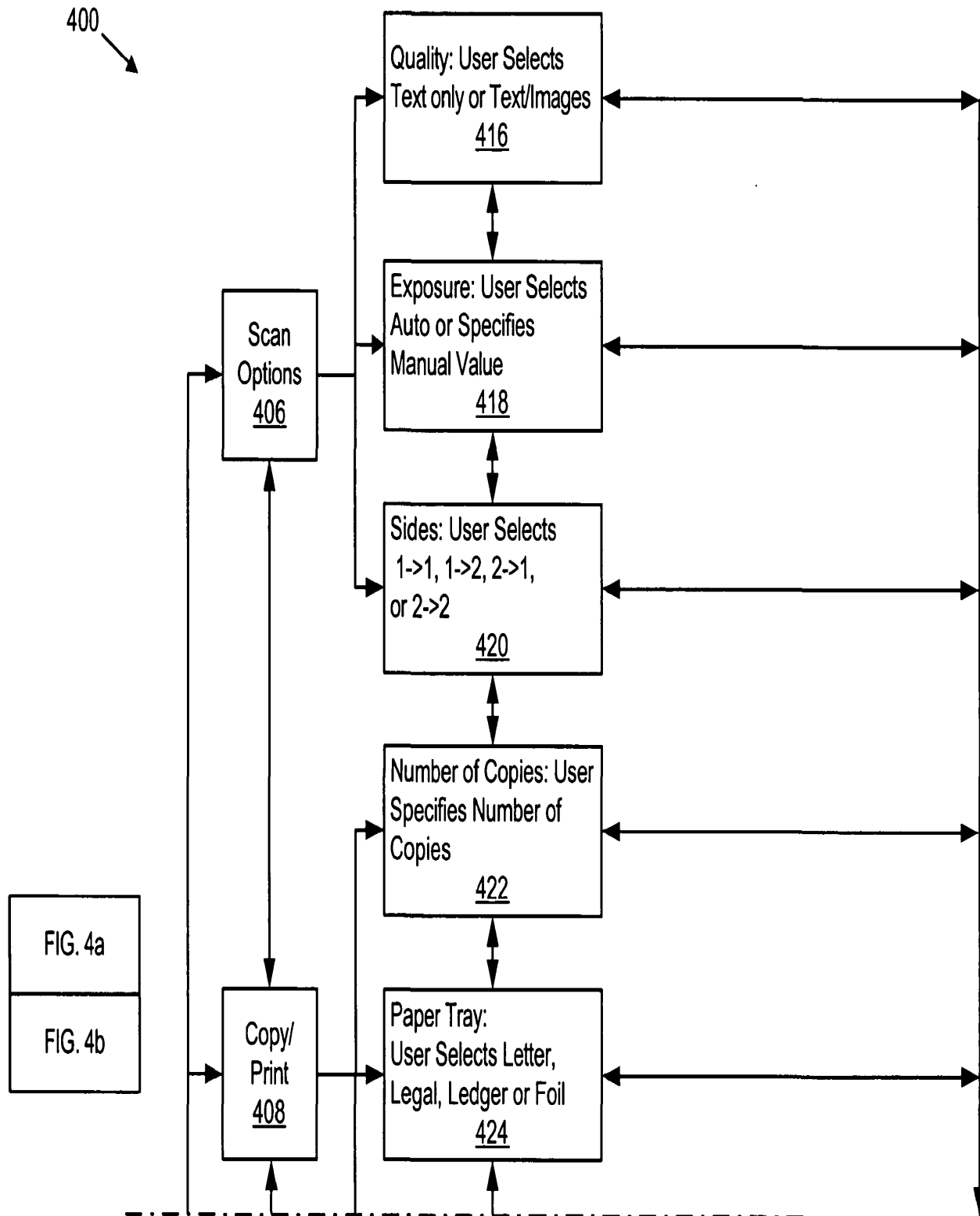


FIG. 4a

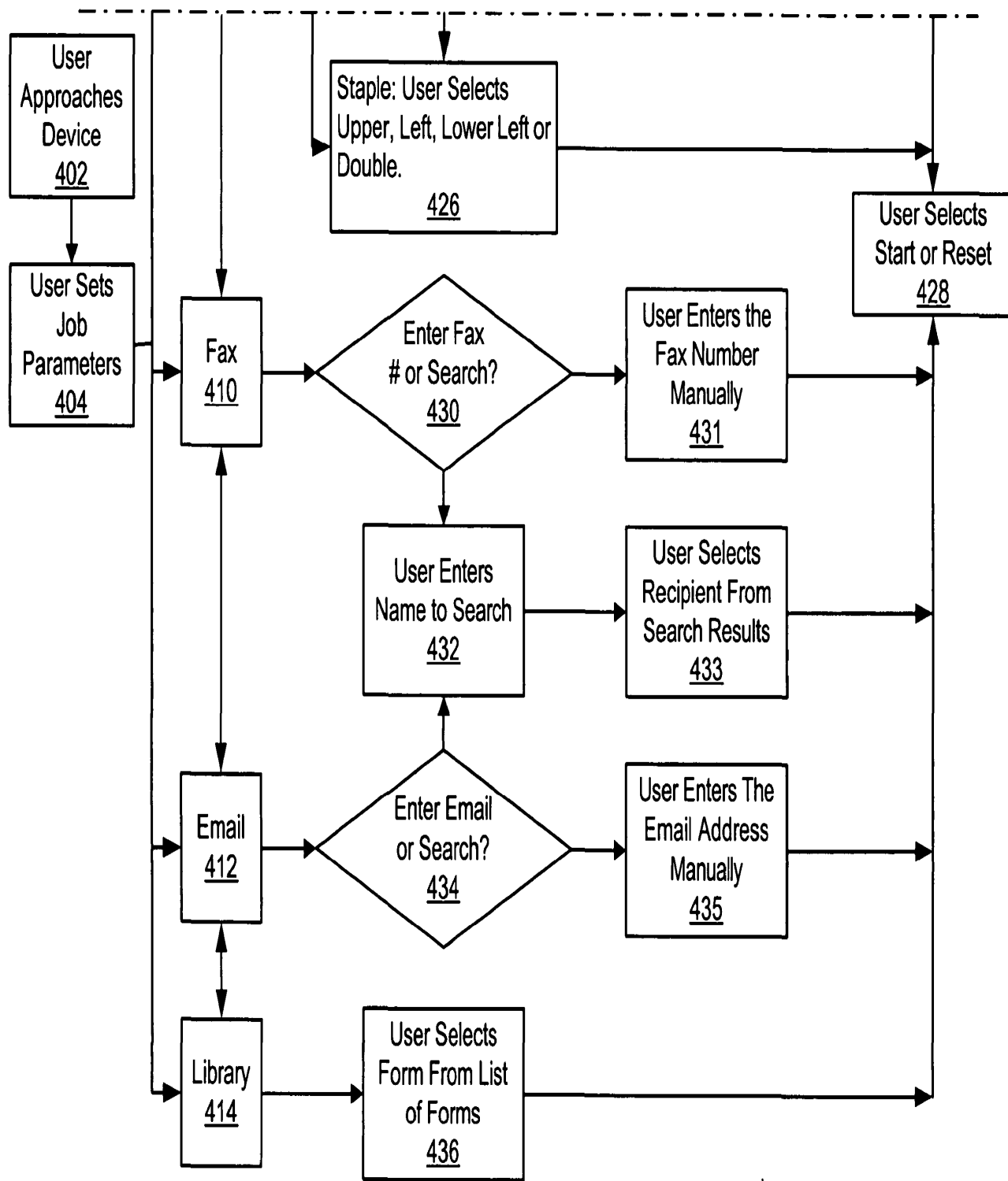


FIG. 4b

PAGE 6/11

108 ↗

502

Copy/Print Fax Email Library

Scan Options:

Quality
 Text Only Text/Images

Exposure
 Auto Lighten Darken

Sides
 1 → 1 1 → 2 2 → 1 2 → 2

Copy/Print

Tray
 Letter Legal Ledger Foil

Staple
 None Upper Left Double Staple

Printer
 B&W

Copies
 1 2 3 4 5 6 7 8 9 0 C ←

Start

Reset

You have selected to:
 ▶ Copy/Print
 Send a fax
 Send an Email
 Print a Form

Please swipe badge

FIG. 5

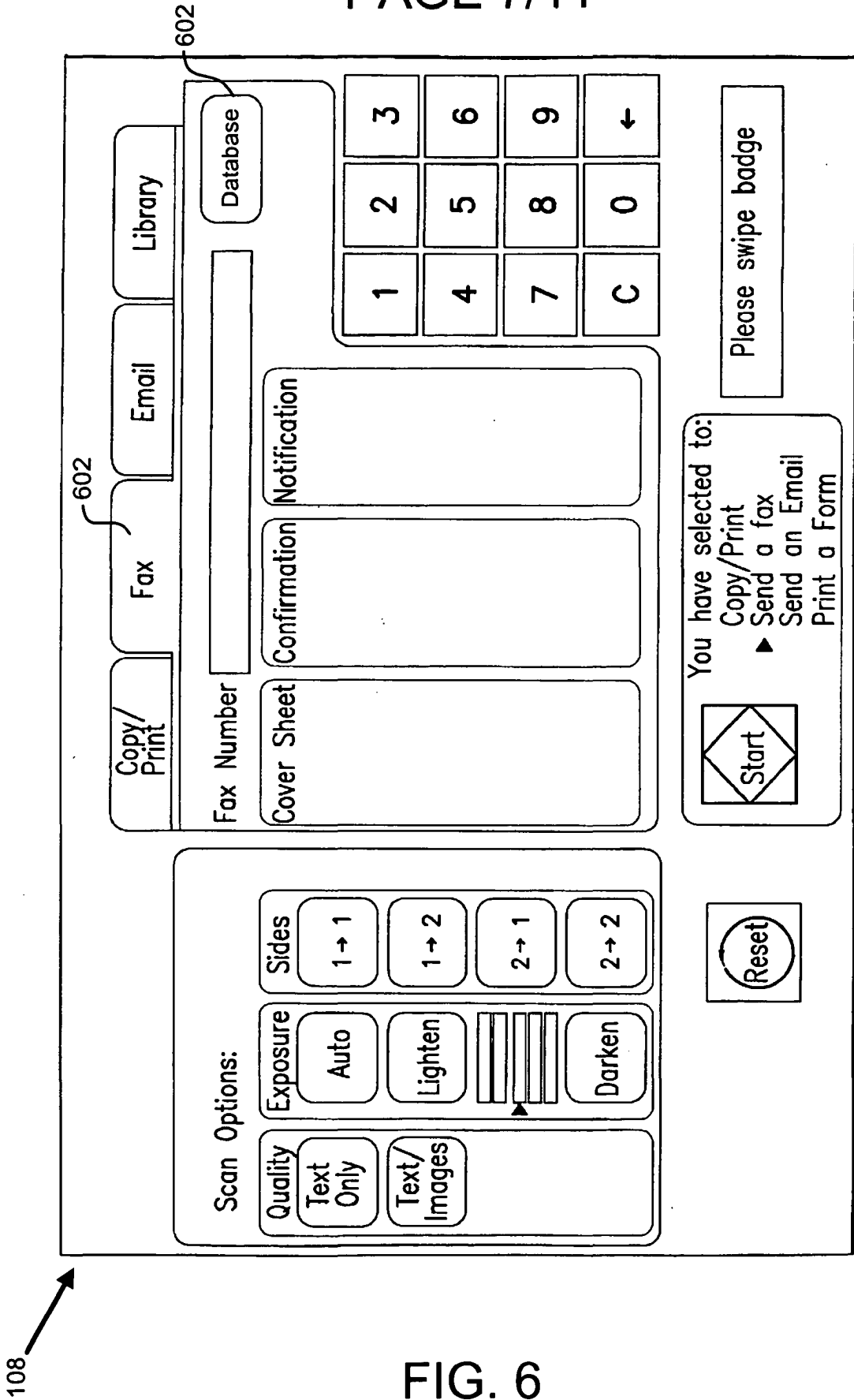


FIG. 6

108 →

es

3

6

9

↓

Search Results:

Select recipient from list

6 People Found

Name	Email Address	Fax Number
		Fax ~ 702
		Fax ~ 702
		Fax ~ 702
		Fax
		Fax
		Fax

New Search

Cancel

☒

Send an Email

☐

Print a Form

S

Qu

T

Q

T

Im

FIG. 7

108

Copy/Print Fax Email Library

Scan Options:

Quality: Text Only, Text/Images

Exposure: Auto, Lighten, [Slider], Darken

Sides: 1→1, 1→2, 2→1, 2→2

Email Address 802

Email Note

Format

PDF: Converts input into a document optimized for viewing and printing

Text: Converts input into a document that can be imported into a word processor for editing

BluePages 804

Reset

Start

You have selected to:
 Copy/Print
 Send a fax
 Send an Email
 Print a Form

Please swipe badge

FIG. 8

108 ↘

108 ↘

502

902

Copy/Print

Fax

Email

Library

Scan Options:

Quality

Text Only

Text/Images

Exposure

Auto

Lighten

Darken

Sides

1→1

1→2

2→1

2→2

Description

Adoption Assistance Claim Form

Applicant Evaluation Form

Cooperative Education/Internship Student Performance Evaluation

Dental Plan Claim Form for 2000

Dental Plan Claim Form for 1999

Dependent Care Expense Verification

Reset

Start

You have selected to:

Copy/Print

Send a fax

Send an Email

Print a Form

Please swipe badge

FIG. 9

1000 ↗

Enter name to search:

~ , Tab Caps Lock Shift

! 1

Q

A

Shift

@ 2

W

S

X

Z

3

E

D

C

\$ 4

R

F

V

% 5

T

G

B

^ 6

Y

H

N

& 7

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* 8

I

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) 0

P

:

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+ =

' "

←

Enter

→

↑ Shift

@

Space

←

→

OK

Cancel

Send an Email

Print a Form

FIG. 10



US005361134A

United States Patent [19]

Hu et al.

[11] **Patent Number:** **5,361,134**[45] **Date of Patent:** **Nov. 1, 1994**[54] **INTEGRATED MULTIFUNCTIONAL DOCUMENT PROCESSING SYSTEM FOR FAXING, COPYING, PRINTING, AND SCANNING DOCUMENT INFORMATION**[75] Inventors: **Darwin Hu**, San Jose, Calif.; **John J. Ring**, Cherry Hill, N.J.[73] Assignee: **Oki America, Inc.**, Hackensack, N.J.[21] Appl. No.: **72,364**[22] Filed: **Jun. 3, 1993****Related U.S. Application Data**

[63] Continuation of Ser. No. 857,215, Mar. 25, 1992, abandoned, Continuation-in-part of Ser. No. 746,831, Aug. 19, 1991, abandoned.

[51] Int. Cl.⁵ **H04N 1/21; G03G 21/00**[52] U.S. Cl. **358/296; 358/401; 358/442; 355/202**[58] Field of Search **358/296, 401, 442, 443, 358/444, 468; 355/202, 204; 400/121**[56] **References Cited****U.S. PATENT DOCUMENTS**

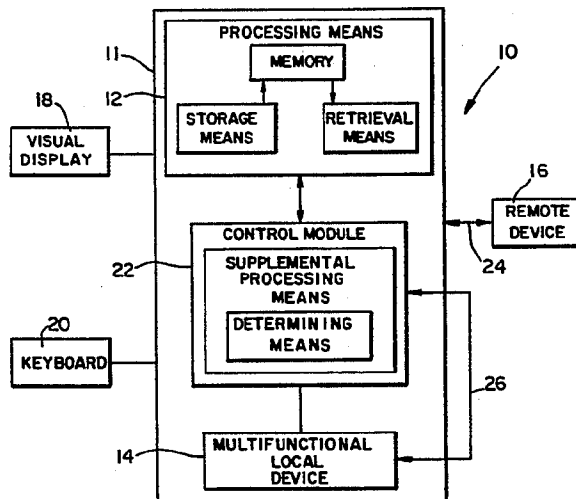
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Primary Examiner—Benjamin R. Fuller*Assistant Examiner*—Eric Frahm*Attorney, Agent, or Firm*—Panitch Schwarze Jacobs & Nadel[57] **ABSTRACT**

A multifunctional document processing system for faxing, copying, printing or scanning document information and for transmitting and receiving document signals to and from a remote device. The system comprises a multifunctional local device which includes a scanner for optically scanning document information, for converting the scanned document information into electrical document signals and for transmitting the document signals to the processor. The multifunctional local device also includes a recording device, such as a printer for receiving document signals from the processor and for producing a recorded form of the document information, such as a printed document based on the received document signals. A control module is interfaced between the processor and the multifunctional local device for receiving document signals from the multifunctional local device and from the remote device and for sending the received documents signals to the processor. The control module also receives document signals from the processor and sends the received document signals to either the multifunctional local device or the remote device. The control module additionally generates and transmits control signals to the multifunctional local device.

10 Claims, 5 Drawing Sheets

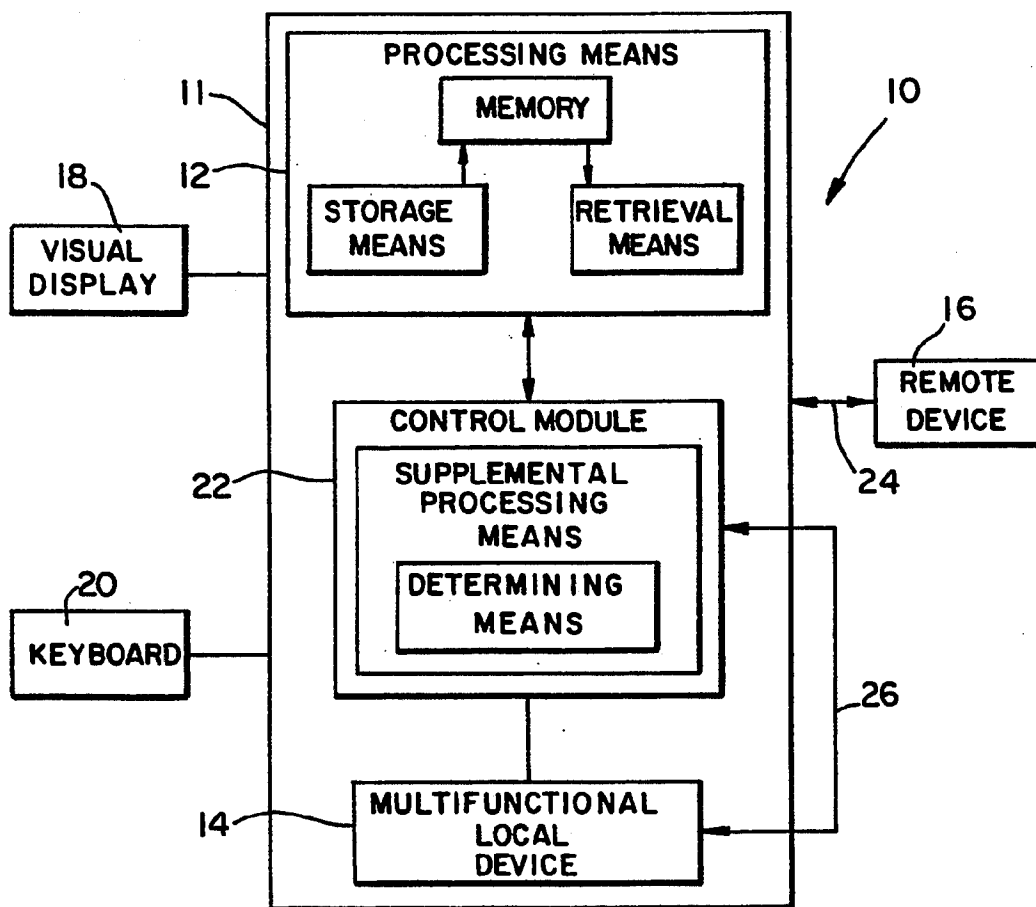


FIG. 1

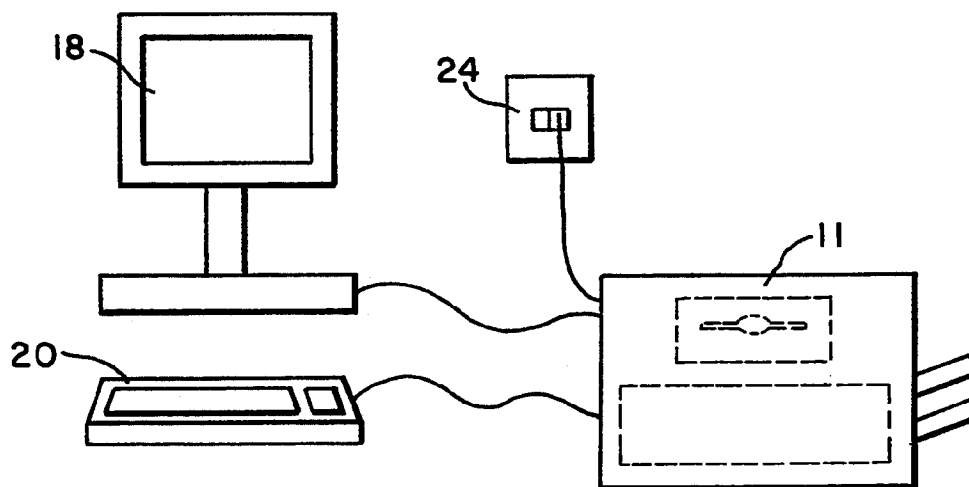
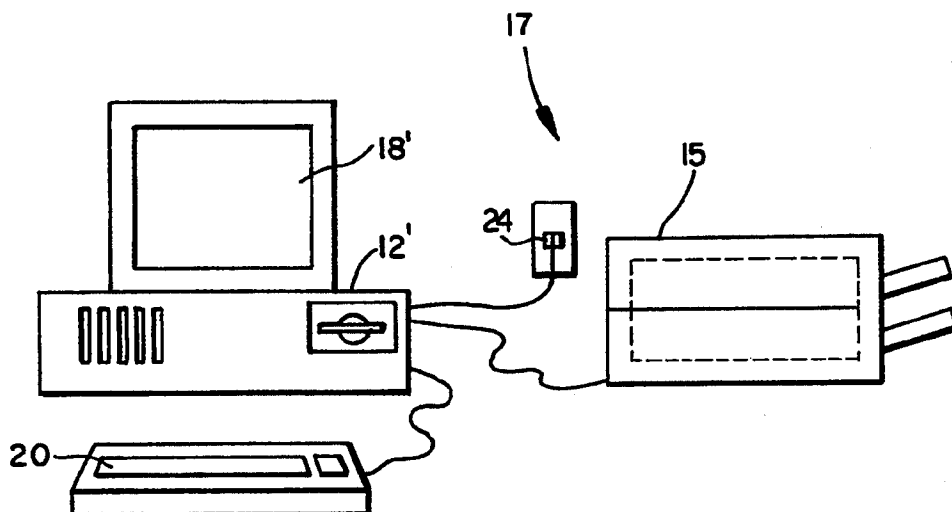
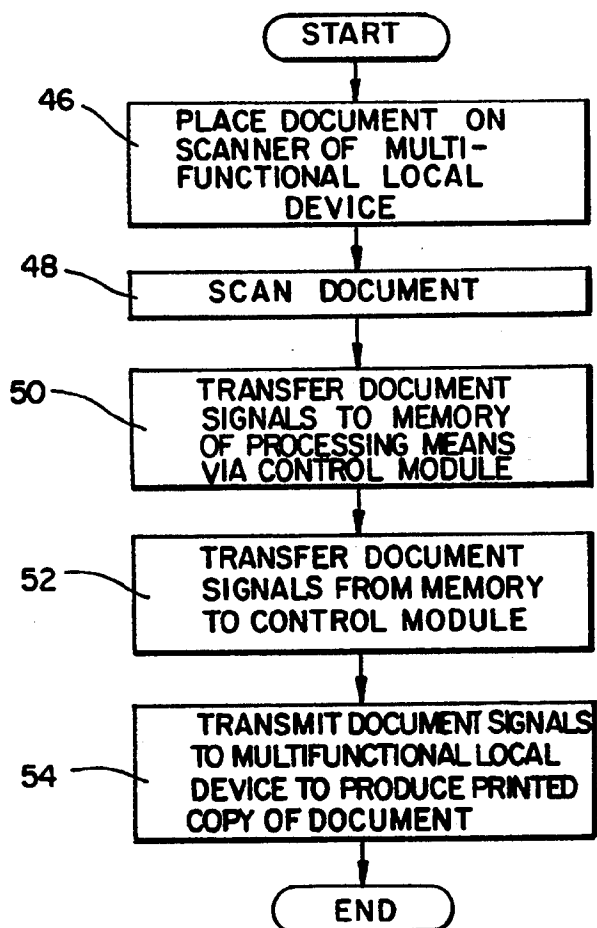
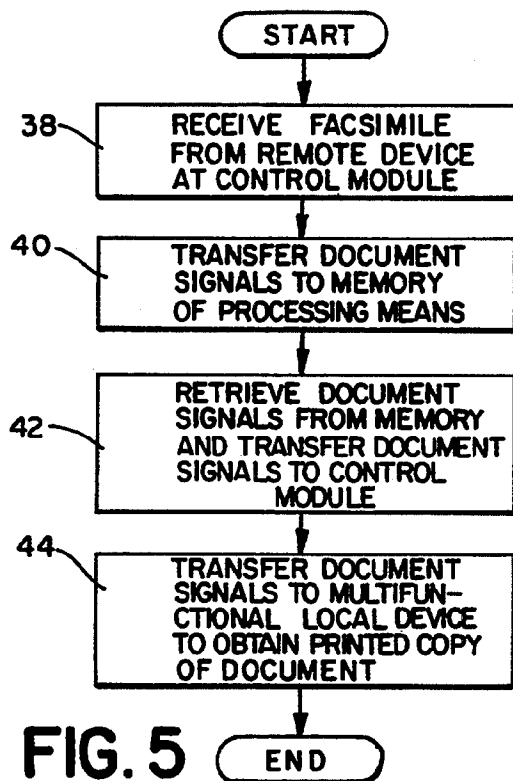
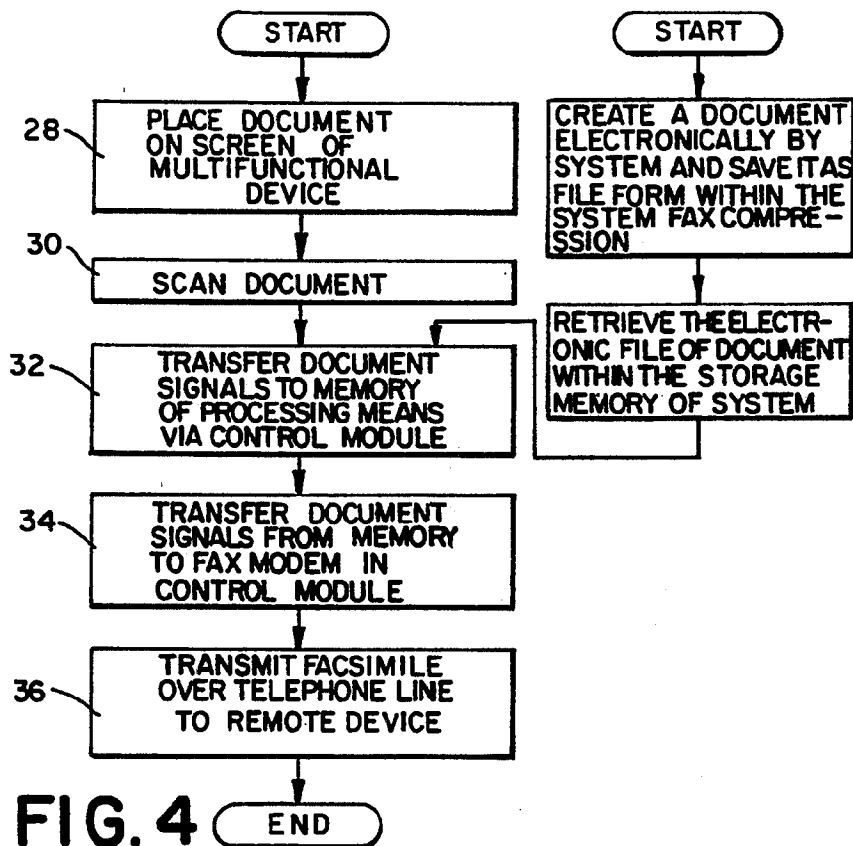


FIG. 2

**FIG. 3****FIG. 6**



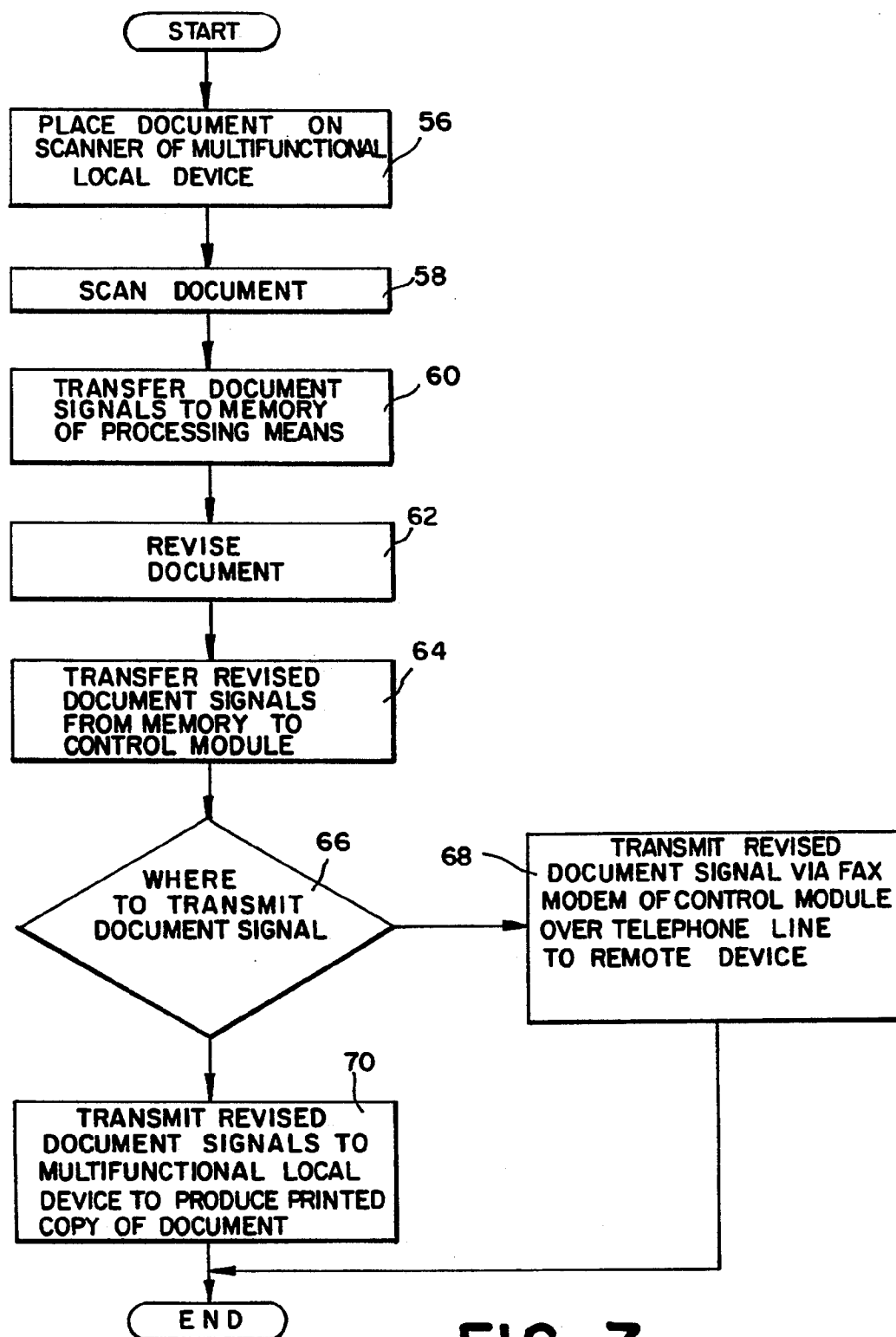
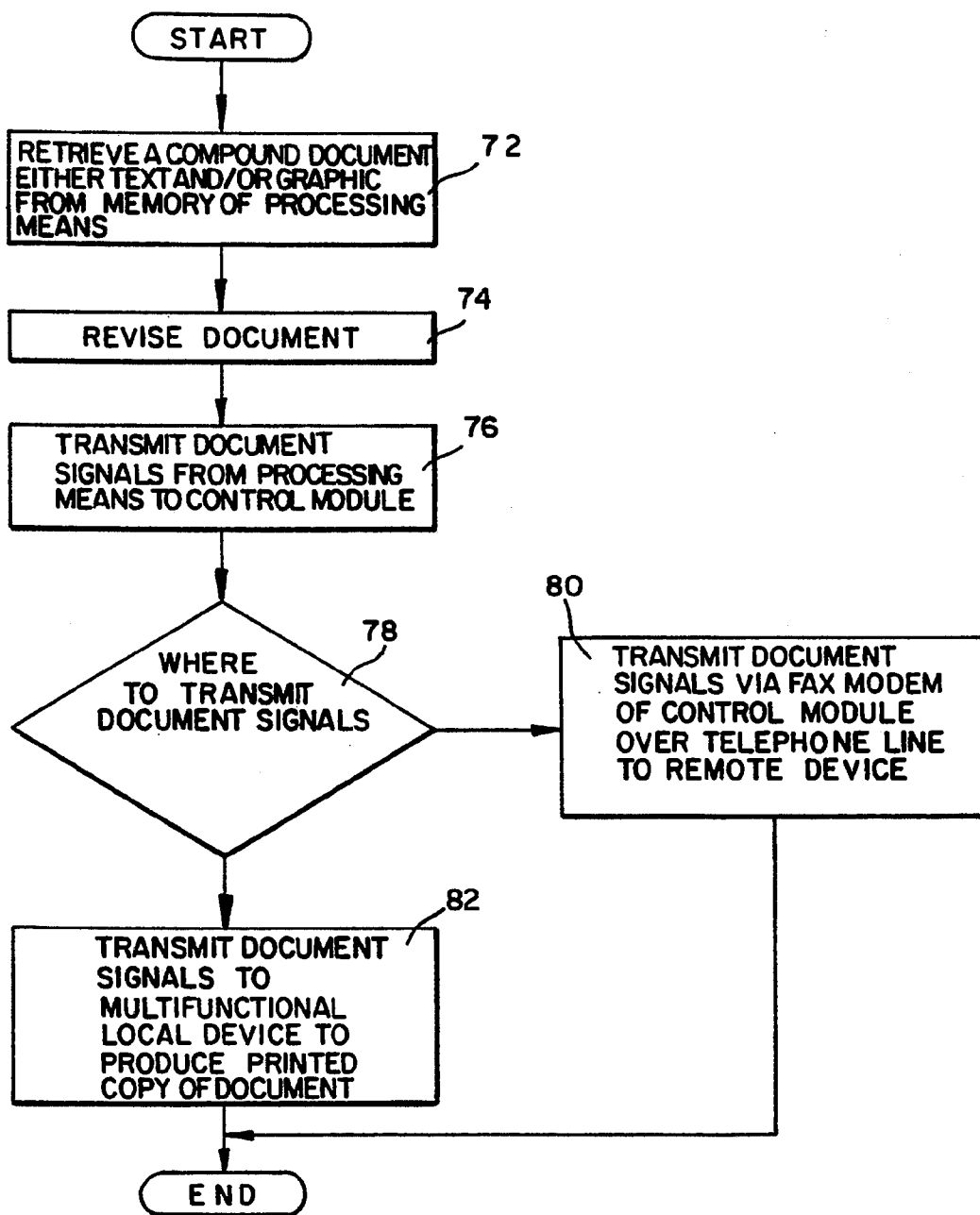


FIG. 7

**FIG. 8**

INTEGRATED MULTIFUNCTIONAL DOCUMENT PROCESSING SYSTEM FOR FAXING, COPYING, PRINTING, AND SCANNING DOCUMENT INFORMATION

This is a continuation of application Ser. No. 07/857,215, filed Mar. 25, 1992 abandoned, which is a continuation-in-part of co-pending application Ser. No. 07/746,831, filed Aug. 19, 1991 abandoned.

BACKGROUND OF THE INVENTION

The present invention relates to an integrated multifunctional document processing system and, more particularly, to a multifunctional document processing system which may be used for processing, scanning, faxing, printing and copying document information.

Most modern offices have separate machines for scanning documents, sending and receiving faxes, printing documents and copying documents. Each such separate machine is restricted to its own particular function and occupies a predetermined amount of office space. If a printed document is to be faxed to a remote location and additional copies of the document are to be made, a facsimile machine must be used to fax a copy of the document to the remote location and a separate copier must be used to make additional copies of the document. The use of two separate machines to accomplish relatively similar functions can be time consuming, particularly if each machine is located in a different part of the office. In addition, two machines can be expensive to acquire and maintain and often require twice as much office space as a single machine which could perform both functions.

In addition, many offices use word processors or personal computers (hereinafter collectively referred to as a personal computer) to create and edit documents. A separate printer, such as a laser printer, LED printer, etc., is usually associated with the personal computer so that printed copies of documents may be obtained from the personal computer. A copy of each of the documents is normally stored within a hard disk or other long term storage device of the personal computer or on a separate floppy disk so that the document can be retrieved at a later point in time if additional copies of the document are needed or to permit editing of the document. If the document is to be edited or revised, the document is retrieved from the memory of the personal computer and the changes are made. A printed copy of the revised version of the document can then be obtained by entering the appropriate instructions into the personal computer for activating the printer to print a copy of the document.

Most other office machines, such as fax machines, copiers and optical scanners are incapable of independently creating or revising a document. Such machines are only capable of accepting documents which are in final form and, in the case of a fax machine, normally must be printed on a type of paper suitable for faxing. For example, if a revised form of a document is to be faxed to a remote location and, prior to faxing, the document must be retrieved from the memory of the personal computer, revised, and reprinted by the printer onto paper before it is ready to be supplied to the fax machine to be faxed. This multi-step, multi-machine operation can be a time consuming process which can ultimately lower the efficiency of an office.

There is a strong need for a single apparatus or device which is capable of creating and editing document information and which also inherently includes the capability of scanning, faxing, printing and copying a document. There is also a need for a system which can ensure confidentiality of documents such that access to the documents is limited to an identified person or a group of identified persons. The apparatus or device should preferably be compact so that the device can be maintained on a desk top and the device must be capable of producing high quality printed copies acceptable for business purposes.

The present invention is directed to an integrated multifunctional document processing system (MDPS) which is capable of scanning, faxing, copying or printing a document. Document information is converted into electrical document signals and is transmitted by a remote device to the MDPS. Alternatively, document information is directly inputted into the MDPS and converted into electrical documents signals. Processing means within the MDPS processes the document signals and transmits the document signals to the remote device or outputs the document signals directly via a multifunctional local paper processing device. The local paper processing device or remote device then performs the desired function, i.e., either scanning, faxing, printing or copying the requested document. The local paper processing device is contained with the MDPS and directly interfaced with the processing means. The remote device is external to the MDPS and interfaced with the processing means of the MDPS. Control means communicates to and from the local paper processing device or remote device and the processing means.

The MDPS of the present invention is user friendly and can be employed for accomplishing a variety of tasks. For example, if a user wanted to prepare a resume and incorporate a photograph, the text portion of the resume can be prepared utilizing the word processing features of the processing means and the photograph can be scanned into the MDPS utilizing a scanner associated with the MDPS. The processing means can then integrate the photograph with the text and the resulting resume can be printed by the local paper processing device of the MDPS. In addition, a previously printed document which is not stored in the MDPS can be updated or changed by scanning the document directly into the processing means using the scanner. The changes can then be made to the paper utilizing the word processing features of the processing means and the revised document can be printed out by the local paper processing device of the MDPS.

The system also permits a single document stored within the memory of the processing means to be sequentially faxed to multiple fax machines at multiple remote locations utilizing fax software within the processing means. Incoming faxes which are received by the system are stored in the memory of the processing means for later printout. The system provides for identified fax documents to be stored in specifically identified memory locations (i.e., mailboxes) within the processing means for later retrieval and/or printout only by a particular person to whom the fax is addressed under the control of a particular security code or password. The system also permits the addressee of a fax to retrieve the fax from a remote location utilizing another fax machine or another multifunctional document processing system. It is clear that the system of the present

invention is more versatile and is able to perform additional tasks or functions which could not be readily performed utilizing a separate printer, scanner and/or fax machine as is done with the prior art.

SUMMARY OF THE INVENTION

Briefly stated, the present invention is directed to an integrated multifunctional document processing system for faxing, copying, printing or scanning document information and for transmitting and receiving document signals to and from a remote device. The document processing system comprises a housing which includes scanning means for optically scanning document information, document information converting means for converting the scanned document information into electrical document signals; and processing means for processing the electrical document signals. A multifunctional local device is located within the housing and includes recording means for receiving document signals from the processing means and for producing a recorded form of the document information based on the received document signals. Control means located between the processing means and the multifunctional local device receives the document signals from the multifunctional local device. The control means also receives document signals from the remote device over a communication medium. The control means sends the received document signals to the processing means. The control means also receives document signals from the processing means and sends the received document signals to either the multifunctional local device or the remote device over the communication medium. The control means further functions to generate and transmit control signals to the multifunctional local device.

BRIEF DESCRIPTION OF THE DRAWING

The foregoing summary, as well as the following detailed description of a preferred embodiment, will be better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, there is shown in the drawings an embodiment which is presently preferred, it being understood, however, that the invention is not limited to the specific methods and instrumentalities disclosed. In the drawings:

FIG. 1 is a schematic block diagram of a preferred embodiment of an integrated document processing system in accordance with the present invention;

FIG. 2 is an elevational view of the integrated document processing system of FIG. 1;

FIG. 3 is an alternate embodiment of the document processing system of FIG. 1;

FIG. 4 is a flow chart depicting the facsimile transmission function of the document processing system of FIG. 1;

FIG. 5 is a flow chart depicting the facsimile reception function of the document processing system of FIG. 1;

FIG. 6 is a flow chart depicting the copying function of the document processing system of FIG. 1;

FIG. 7 is a flow chart depicting the scanning and editing functions of the document processing system of FIG. 1; and

FIG. 8 is a flow chart depicting the editing and printing functions of the document processing system of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings wherein like numerals indicate like elements throughout, there is shown in FIGS. 1 and 2, an embodiment of an integrated multifunctional document processing system (MDPS) 10 in accordance with the present invention. The MDPS 10 comprises a housing 11 which forms a single stand alone unit containing the necessary logic and circuitry for scanning, printing, copying or faxing a document. The MDPS 10 comprises processing means 12 which receives document signals from a multifunctional local paper processing device or multifunctional local device 14, preferably located within the MDPS housing 11 or a remote device 16, for processing of the document signals within the multifunctional local device 14 or transmitting the document signals to the remote device 16. The processing means 12 which is illustrated in FIG. 2 is preferably a personal computer, such as, but not limited to, an IBM or an IBM compatible computer, or any other type of processor which is adapted to be integrated into the housing 11 of the MDPS 10. It is to be understood by those skilled in the art that any other brand or type of computer system, word processing system, whether networked or stand alone, or any other type of related device could be used in conjunction with the MDPS 10 without departing from the spirit and scope of the present invention. The terms processing means, personal computer and host computer are used herein only for the sake of brevity and should not be considered a limitation on the present invention.

The processing means 12 as illustrated includes a hard disk (not shown) as well as a main memory (not shown) which together act as the main storage data facility or memory of the processing means 12 in the usual manner well-known in the art.

Document signals received from the multifunctional local device 14 and the remote device 16 are stored within the memory of the processing means 12 until the signals are retrieved and processed. Auxiliary storage devices, such as floppy discs or the like can also be used to store the document signals received from the multifunctional local device 14 or the remote device 16 for later processing of the document signals.

The processing means 12 is preferably connected to a visual display device 18, such as a CRT, for displaying a document on-line. A user of the MDPS 10 can retrieve document signals from the memory of the processing means 12 and can display the document on the visual display device 18 for editing or otherwise changing the document. In addition, a keyboard 20 is associated with the processing means 12 for creating and revising documents which can be stored within the memory. The keyboard 20 may also be used for inputting instruction commands to the multifunctional local device 14. It is to be understood by those skilled in the art that any form of editing or creating device can be also used in conjunction with the processing means 12, such as, but not limited to, a touch screen, a laser pen, a mouse or the like.

The processing means 12 is interfaced with a control means, which is preferably a control module 22 located within the housing 11 of the MDPS 10, which passes document signals between the processing means 12 and the multifunctional local device 14 or the remote device 16. The control module 22 is preferably a self-contained plug-in printed circuit board or card which can be con-

veniently inserted within an available port (not shown) within the processing means 12. The control module 22 is an intelligent controller which controls all communication, printer emulation, printer, scanner and fax functions within the MDPS 10. The control module 22 can further include a supplementary processor (not shown) which is preferably a 32 bit processor, such as an Intel 80960 processor. The supplementary processor can also be a 16-bit or a 64-bit processor. The supplementary processor receives document signals from the processing means 12 or from the multifunctional local device 14 and determines the function which is to be performed with respect to the received document signals, i.e., print, fax, etc., and the destination of the document signals, i.e., to the multifunctional local device 14, to the remote device 16 or to the processing means 12. The functions which can be performed with respect to the document signals are scanning a document, faxing a document to a remote location, receiving a document faxed from a remote location, copying a document, and printing a document.

The control module 22 further includes a facsimile modem (not shown) for transmitting or receiving facsimiles to or from a remote location via the remote device 16 which in the present embodiment is a remotely located fax machine. The facsimile modem operates in the usual well-known manner to transmit documents over a communicating medium 24, such as the public switched telephone network and comprises 16 8-bit control registers. If the document signals received by the control module supplementary processor are to be faxed to the remote device 16 or have been received from the remote device 16, the supplementary processor accesses the facsimile modem for proper transmission or reception of the document signals. The supplementary processor accesses the control registers of the facsimile modem through an 8-bit parallel port (not shown). The parallel port transfers transmitting document signals and receiving document signals in an 8-bit data format.

As discussed above, the control module 22 controls all print, scan and fax functions. When the control module 22 receives document signals from the processing means 12, the control module 22 first identifies what function is to be performed and at what destination. In the preferred embodiment, the document signals received by the control module 22 are coded so that the control module 22 can easily identify the function which is to be performed. The code is preferably one that is easily recognized by the control module supplementary processor. For example, if the control module 22 is to transmit document signals to the remote device 16, such as through a facsimile transmission, the document signals received from the processing means 12 are transferred within the control module 22 to the facsimile modem (not shown) which converts the document signals into the appropriate format and then transmits the document signals over a communication medium 24 to the remote device 16. In the preferred embodiment, the communication medium 24 is a telephone link. It is to be understood by those skilled in the art that any suitable communication medium or transmission device can be used such as, but not limited to a modem or a UART. The remote device 16 can be a conventional facsimile or a multifunctional machine, such as, but not limited to a combination copier and facsimile, a combination facsimile and personal computer, or a device

capable of scanning, faxing, copying or printing a document.

When a local function is to be performed such as printing or copying a document, the document signals are transmitted from the processing means 12 to the control module 22, which transfers the document signals to the multifunctional local device 14 contained within the housing of the MDPS 10. The multifunctional local device 14 in the preferred embodiment is employed for processing paper and preferably includes scanning means, such as a standard optical scanner for optically scanning document information and converting the scanned document information into electrical document signals. The multifunctional local device 14 also includes a recording or printing means, such as a standard printer for receiving document signals from the processing means 12 and for producing a recorded form of the document information, for example, a printed document based on the received document signals. In the presently preferred embodiment, the optical scanner is a removable hand held scanner and the printer is a standard LED printer, such as an OL800 printer which is commercially available from Okidata, Inc. It should be recognized that any other type of scanner and/or recording device, such as a film recorder, screen or other such device could alternatively be employed.

An interface 26 is located between the control module 22 and the multifunctional local device 14 for transmitting information in the form of electrical document signals and control signals between the control module 22 and the multifunctional local device 14, such as instructions for performing a particular function or status information. In the preferred embodiment, the interface 26 is a high speed serial video interface but some other appropriate interface, such as a small computer system interface (SCSI) could be employed.

Three types of document signals are communicated over the interface 26 from the control module 22 to the multifunctional local device 14. The first type of signals transmitted to the multifunctional local device 14 instruct the multifunctional local device 14 to print a particular document based upon particular document signals received from the processing means 12. The second type of signals transmitted to the multifunctional local device 14 instructs the multifunctional local device 14 to scan a particular document utilizing the scanner and to transmit the document signals from the scanner to the processing means 12. The third type of document signals transmitted to the multifunctional local device 14 act as a command or response communication to the multifunctional local device 14 and include printer, scanner and data flow control signals. All commands and responses are transferred between the multifunctional local device 14 and the control module 22 along the same physical connection via the interface 26.

Referring specifically to FIG. 3, there is shown an alternate embodiment of a document processing system 17 in accordance with the present invention. In the alternate embodiment, the processing means 12' is preferably an independent or stand alone personal computer which is attached to a separate stand alone multifunctional local peripheral device 15 by a control module (not shown) located within the personal computer. The control module is also connected to a remote device by a communication medium 24 which is preferably a standard telephone line. The document processing system 17 operates in a manner similar to that of the MDPS 10

and therefore, the detail of its operation will not be described further.

Referring to FIGS. 4-8, there are shown functional flow diagrams depicting a preferred manner for performing the various document processing functions in accordance with the above-described embodiment of the document processing system 10. Referring specifically to FIG. 4, there is shown a flow diagram depicting the preferred method by which the MDPS 10 functions to send or transmit a fax of a previously printed document to a remote location, such as to the remote device 16. The faxing function begins by placing a previously printed document to be faxed on the scanner (not shown) of the multifunctional local device 14 as depicted in block 28 or by passing the scanner over the document. The document is scanned and the information from the document is converted by the scanner and associated components into electrical document signals in block 30. In the preferred embodiment, the electrical document signals are initially digitized by the scanner and then converted into electrical signals. The document signals are then transferred to the memory of the processing means 12 utilizing the control module 22 as illustrated in block 32. The processing means 12 determines when the document signals are to be processed and may also maintain a stored copy of the document signals in the memory until a user of the MDPS 10 chooses to delete the document signals. The document signals are also transferred from the memory of the processing means 12 back to the control module 22 as illustrated in block 34. The control module 22 first determines that a facsimile transmission is to be performed and the document signals are transferred to the facsimile modem which is located within the control module 22. The document signals are then transmitted by the control module facsimile modem to the remote device 16 over the communication medium 24 as depicted in block 36. A printed copy of the facsimile transmission is produced at the remote device 16 in the manner well-known in the art depending upon the type of remote device 16 being employed.

Referring specifically to FIG. 5, there is shown a flow diagram depicting the preferred method by which a facsimile is received by the MDPS 10. A facsimile transmitted from the remote device 16 is transmitted as document signals over the communication medium 24 to the control module 22 as shown in block 38. The control module 22 determines whether the received document signals are to be transmitted to the processing means 12 or the multifunctional local device 14. Once the control module 22 detects that the document signals are an incoming facsimile received from the remote device 16, the received document signals are transferred to the memory of the processing means 12 as illustrated in block 40. If the multifunctional local device 14 is otherwise occupied when a printed copy of the facsimile is to be obtained, the received facsimile document signals can be stored in the memory of the processing means and retrieved by the user to be viewed on the visual display 18 associated with the processing means 12. A user can also request that a printed copy of the received facsimile be made if the multifunctional local device 14 is available. The received facsimile document signals are retrieved from the memory of the processing means 12 and are transferred to the control module 22 as shown in block 42. Once the control module 22 determines that the document signals are to be printed the control module 22 transfers the document signals to the

multifunctional local device 14 to obtain a printed copy of the document as shown in block 44. In the preferred embodiment, the received facsimile is printed on plain paper. An indicator (not shown) may be associated with the multifunctional local device 14 to indicate to a user that a facsimile has been received. The indicator could either be a visual indicator, such as an LED or other lighted indicator or an audible indicator, such as an audible alarm signal.

Referring specifically to FIG. 6, there is shown a flow diagram depicting a preferred method of performing the copying function of the MDPS 10. A previously printed document to be copied is first placed on the scanner of the multifunctional local device 14 or the scanner is passed over the document as illustrated in block 46. The document is scanned and the information from the document is converted by the scanner and associated components into electrical document signals as shown in block 48. The document signals from the scanner are transferred from the multifunctional local device 14 to the memory of the processing means 12 via the control module 22 as illustrated in block 50. The document signals are then processed and are transferred from the memory of the processing means 12 back to the control module 22 as illustrated in block 52. Once the control module 22 has determined that a copying function is to be performed, the document signals are transferred from the control module 22 to the multifunctional local device 14 to produce a printed copy of the document as shown in block 54. If multiple copies of the document are to be made or the copies are to be made on a particular sized paper, the document signals are coded to indicate the particular instructions to the multifunctional local device 14 to obtain the desired number or sized copies.

Referring specifically to FIG. 7, there is shown a flow diagram depicting the preferred method of performing the editing function of the MDPS 10. A previously printed document is placed on the scanner of the multifunctional local device 14 as shown in block 56. The document is scanned and the information from the document is converted by the scanner into electrical document signals as shown in block 58. The document signals are transferred from the multifunctional local device 14 to the memory of the processing means 12 via the control module 22 as illustrated in block 60. If the document is to be edited or revised, the document is retrieved from the memory of the processing means 12 and viewed on the visual display 18 associated with the processing means 12 for editing using the keyboard 20. Once the desired changes have been made to the document, using the keyboard 20, the edited document may be stored in the memory of the processing means 12 for later use. The document may also be faxed to a remote location or printed. The document signals are transferred to the control module 22 as shown in block 64. The control module 22 determines in block 66 whether the document signals are to be faxed to the remote device 16 or sent to the multifunctional local device for printing 14. If the document signals are to be faxed to the remote device 16, the control module 22 transfers the document signals to the facsimile modem which transmits the document signals over the communication medium 24 to the remote device 16 as shown in block 68. If the document signals are to be transferred to the multifunctional local device 14 for printing, the control module 22 transmits the document signals to the multi-

functional local device 14 to produce a printed copy of the document as shown in block 70.

Referring specifically to FIG. 8, there is shown a flow diagram depicting the preferred method of performing the printing function of the MDPS 10. A document to be printed is either created in the processing means 12 by using the keyboard 20 or is retrieved from the memory of the processing means 12 as shown in block 72. If revisions are to be made to the document, the document is revised in the processing means 12 as shown in block 74. The document signals are then transmitted from the processing means 12 to the control module 22 in block 76. The control module 22 determines what function is to be performed with the document signals as shown in block 78. If the selected function is to fax the document to the remote device 16, the document signals are transferred to the facsimile modem located in the control module 22 which transmits the document signals over the communication medium 24 to the remote device 16 as shown in block 80. If the document is to be printed the document signals are transferred from the control module 22 to the multifunctional local device 14 to produce a printed copy of the document as illustrated in block 82.

From the foregoing description, it can be seen that the present invention is directed to an integrated multifunctional document processing system 10 which is capable of scanning, faxing, copying and printing a document and for transmitting and receiving document signals to and from a remote device. It will be recognized by those skilled in the art that changes may be made to the above-described embodiment of the invention without departing from the broad inventive concepts thereof. It is understood, therefore, that this invention is not limited to the particular embodiments disclosed, but is intended to cover all modifications which are within the scope and spirit of the invention as defined by the appended claims.

We claim:

1. An integrated multifunctional document processing system for faxing, copying, printing or scanning document information and for transmitting and receiving document signals to and from a remote device, the multifunctional document processing system comprising:

a housing;

main processing means located within the housing for processing all electrical document signals;

a multifunctional local device physically separate from but electrically connected to said main processing means, said multifunctional device located within the housing, said multifunctional local device including scanning means for optically scanning document information and for converting the scanned document information into electrical document signals, transmitting means for transmitting document signals to the main processing means, receiving means for receiving document signals from the main processing means, and recording means for producing a recorded form of document information based on received document signals;

a control means located within the housing, interfaced between the main processing means and the multifunctional local device, and having supplemental processing means for processing electrical document signals, the control means, under the control of the supplemental processing means, for receiving all incoming document signals from the

multifunctional local device and from the remote device over a communication medium and for sending the received incoming document signal to the main processing means, the main processing means for processing the incoming document signals received from the control means and for processing and transmitting outgoing document signals, the control means also for receiving all outgoing processed document signals from the main processing means and sending received outgoing processed document signals to the multifunctional local device or the remote device over the communication medium, the control means functioning to require that all document signals from the local and remote devices be transmitted to the main processing means and that all processed document signals from the main processing means be transmitted to the local or remote devices, the control means further functioning, under the control of the supplemental processing means, to generate and transmit control signals to the multifunctional local device;

storing means for storing document signals received from said local device or said remote device in a memory within said main processing means;

determining means within the supplemental processing means for determining a destination for the stored document signals based on the received document signals; and

retrieving means for retrieving stored document signals from the memory and transmitting the retrieved document signals to a destination established by the determining means.

2. The system according to claim 1, wherein the recording means is a printer integrated within the multifunctional local device which produces printed documents.

3. The system according to claim 2, wherein the printer is an LED page printer.

4. The system according to claim 1, wherein the control means further includes memory means for storing document signals received from the multifunctional local device or the remote device and for storing document signals transmitted from the processing means.

5. The system according to claim 1, wherein the processing means can selectively substantively edit document signals received from the remote device or the multifunctional local device and transmit the edited document signals to the multifunctional local device or the remote device.

6. The system according to claim 1, wherein the control means supplements processing functions performed by the processing means.

7. The system according to claim 1, wherein the processing means further includes memory means for storing document signals received from the multifunctional local device and the remote device.

8. A method of utilizing a multifunctional document processing system for transmitting a facsimile of a document to a remote location, the multifunctional document processing system including scanning means for optically scanning document information and main processing means for processing all document information, the scanning means and main processing means located within a housing, the method comprising the steps of: placing a document to be faxed on the scanning means of the multifunctional document processing system;

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scanning the document;
 converting the scanned document into electrical document signals;
 transferring the document signals to the main processing means utilizing a control module having supplemental processing means for processing electrical document signals within the control module, the control module being located within the housing;
 determining in the supplemental processing means a destination for the document signals;
 transferring the document signals from the main processing means to the control module;
 identifying the destination of the document signals to be a facsimile modem;
 transferring the document signals to the facsimile modem destination associated with the control module;
 transmitting the document signals from the facsimile modem to a device at the remote location over a communication medium; and
 printing a copy of the transmitted facsimile at the remote location.

9. A method of utilizing a multifunctional document processing system for receiving a facsimile of a document to a remote location, the multifunctional document processing system including printing means for producing a printed document and main processing means for processing all document signals, the printing means and main processing means located within a housing, the method comprising the steps of:

receiving document signals from a device at the remote location over a communication medium at a control module having supplemental processing means for processing electrical document signals within the control module, the control module being located within the housing;
 transferring the document signals from the control module to the main processing means;
 determining in the supplemental processing means a destination for the document signals;

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identifying the destination of the document signals to be the multifunctional document processing system;
 retrieving the document signals from the main processing means and transferring the document signals to the control module;
 transferring the document signals from the control module to the multifunctional document processing system destination; and
 producing a printed copy of the document at the multifunctional document processing system.

10. A method of utilizing a multifunctional document processing systems for making a copy of a document, the multifunctional document processing system including scanning means for optically scanning document information, main processing means for processing all document information, and printing means for producing a printed document, the scanning means, processing means, and printing means located within a housing, the method comprising the steps of:

placing a document on the scanning means of the multifunctional document processing system;
 scanning the document;
 converting the scanned document into electrical document signals;
 transferring the document signals to the main processing means utilizing a control module having supplemental processing means for processing electrical document signals within the control module, the control module being located within the housing;
 determining in the supplemental processing means a destination for the document signals;
 transferring the document signals from the main processing means to the control module;
 identifying the destination of the document signals to be the printing means;
 transferring the document signals from the control module to the printing means of the multifunctional document processing system; and
 producing a printed copy of the document.

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